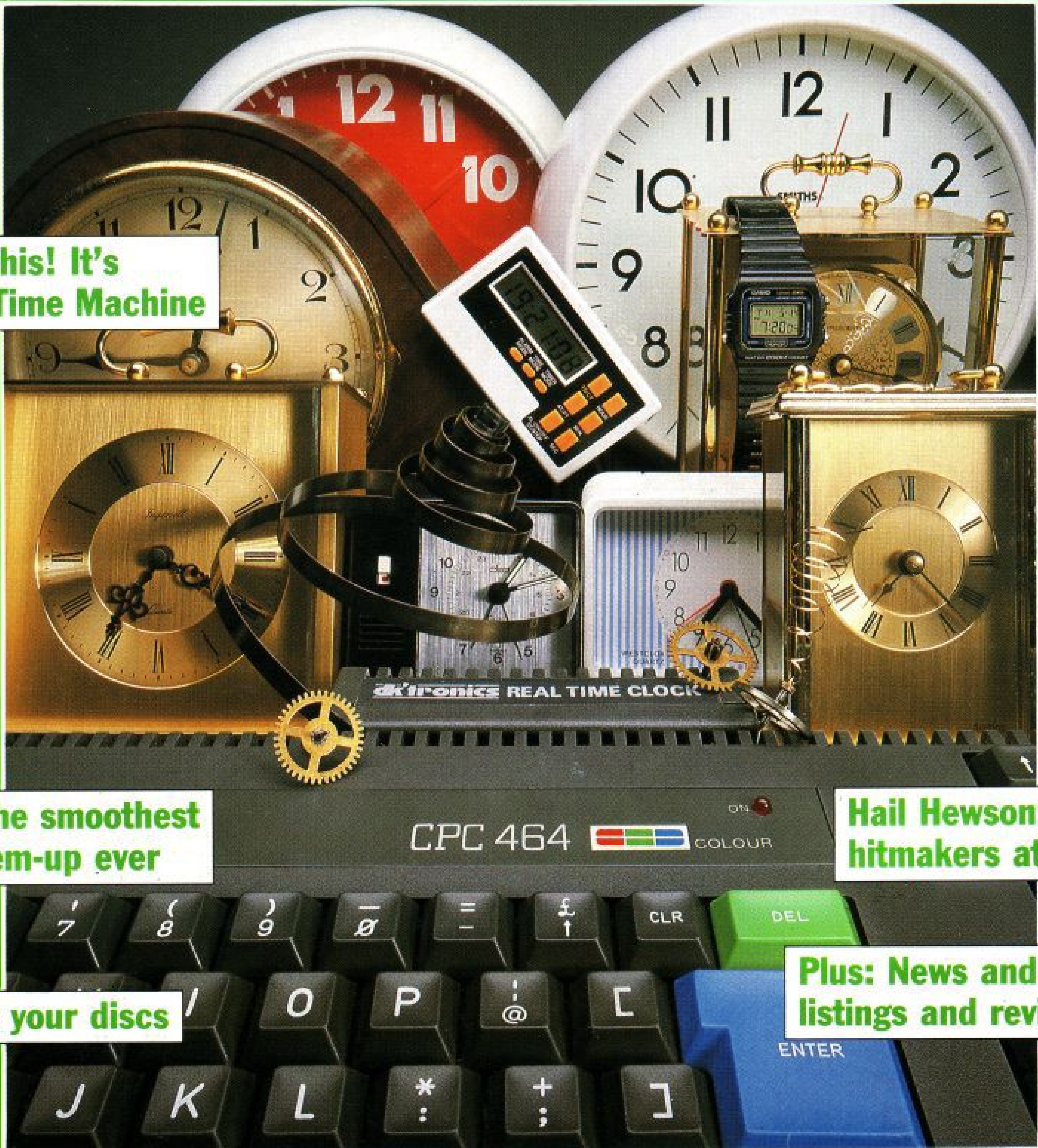
BURTON

July 1987 £1.00

AMSTRAD COMPUTER USER



Clock this! It's DKT's Time Machine

ZTB: The smoothest shoot-em-up ever

Driving your discs

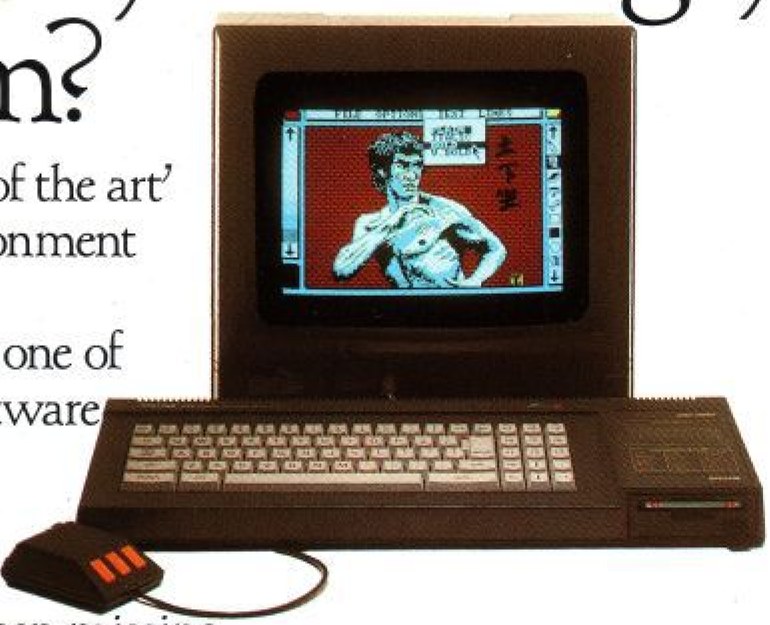
Hail Hewson: The hitmakers at home

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Official Amstrad Home Computing Magazine

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Denmark Kr. 31.00
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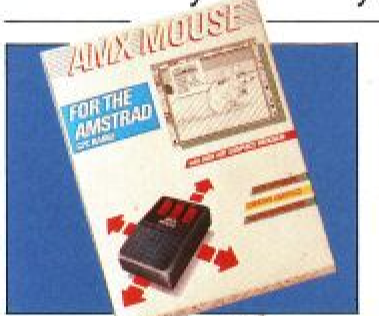
What's so special about the Mac, the Atari St, the Amiga, Windows and Gem?



It's no surprise that nearly all new 16 bit 'state of the art' micros now come with a Mouse and Wimp environment (Windows, Icons, Menus and Pointers) as standard.

With the AMSTRAD CPC you already own one of the classic micros and by simply adding AMX software you can achieve the same ease of use, freedom and versatility of much more sophisticated computers.

The AMX Mouse and compatible software – it's what you and your AMSTRAD micro have been missing.

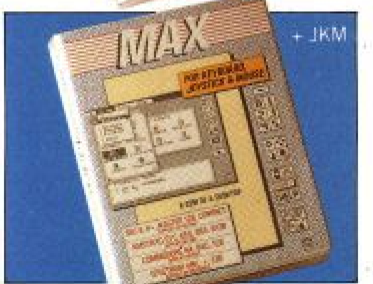


ART AND MOUSE OPERATING SYSTEM

AMX MOUSE PACKAGE Tape and 3" Disc — £69.95

There's not much joy in a joystick and keyboards can be all fingers and thumbs. Acclaimed by the press as 'the best input device', already over 50,000 micro users have adopted an AMX Mouse. The Mouse comes with fantastic Art Software and AMX control which enables you to create a Mouse environment in your own programs. Available for Amstrad CPC 464, 664, 6128.

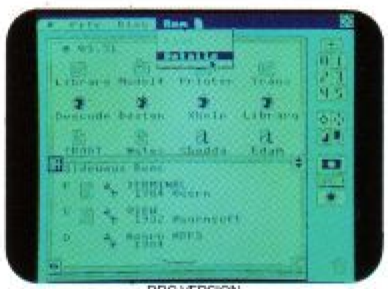




GRAPHIC DFS FRONT END

MAX 3" Disc — £19.95

MAX provides an easy to use graphic based front end to your computer's disc filing system including a comprehensive set of disc management operations such as cataloging, copying, deleting and re-naming, also included are disc utilities such as sector editing, recovering erased files, formatting, verifying and faster tracking. You can also run programs from within MAX. Available for Amstrad CPC, 464, 664, 6128.



BBC VERSION



DESKTOP PUBLISHING

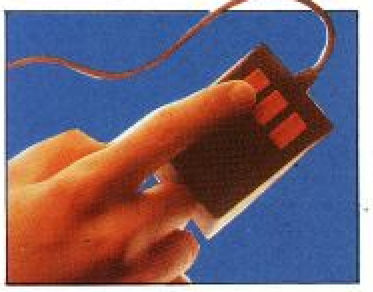
AMX PAGEMAKER 3" Disc — £49.95

Produce professional documents and newspapers with text and graphics, supplied with 16 variable typefaces it has many graphic functions including cut, copy, paste, etc. Available Now.



EXTRA! EXTRA! 3" Disc — £24.95

300K fantastic clip art, over 25 fonts.
Available February 1987. For use with the Amstrad CPC 6128, CPC 664 (+ 64K min add on Ram), CPC 464 (+ 64K min add on Ram + Disc Drive)



AMX MAGAZINE MAKER 3" Disc — £129.95

A combination of AMX Pagemaker and the Rombo Vidi-Video digitiser. Using any video and the digitiser, images from a camera or TV can be converted into a graphics screen with Pagemaker to illustrate magazines or newsletters.



There is also a growing list of AMX support software including: AMX 3D Zicon (3" Disc) **£24.95** with Zicon you can transform vector data into on screen graphics. Printers and plotters are fully supported, AMX Utilities (3" Disc) **£19.95.** Utility software for the original art program supplied with the AMX Mouse. A Mouse and interface (only) can be purchased for **£34.95** direct from AMS using the order form enclosed in MAX, AMX Pagemaker and AMX 3D Zicon. These superb products are available from all good computer dealers or direct by cheque, Access or Visa. All prices include VAT and post and packaging.

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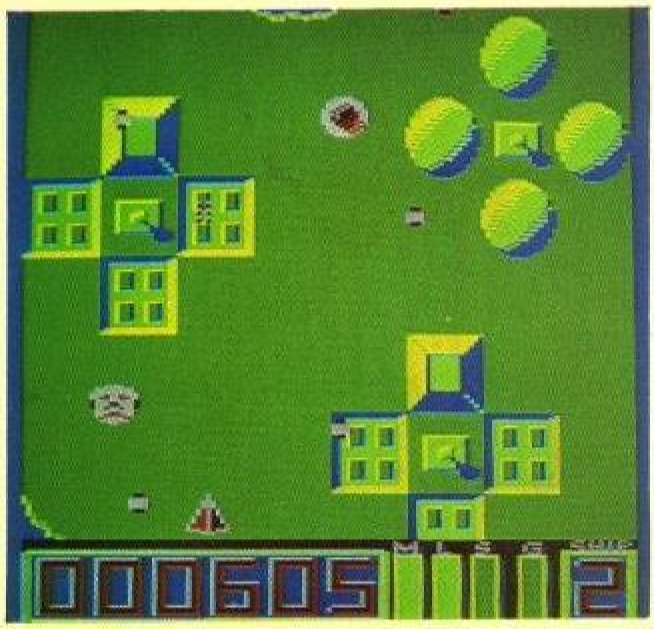
CONTENTS

REGULARS

PROGRAMMING

REVIEWS

FEATURE



AMSTRAD COMPUTER USER

The official magazine for all users of Amstrad computers

Cover photo: Martyn Howlett

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MASTERFILE III

FOR THE AMSTRAD CPC 6128 (ALSO CPC 464/664 WITH DK 'TRONICS 64K RAM)

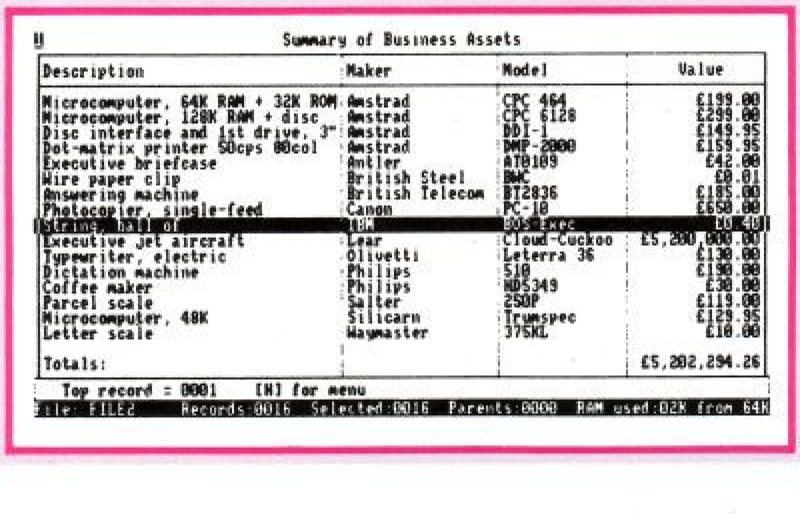
FIRMLY ESTABLISHED ...

MASTERFILE III is now firmly established as THE filing system for the CPC6128. It has received rapturous reviews and we could paper the walls of our new offices with our customers' letters of appreciation.

For the benefit of newcomers to the CPC machines: MASTERFILE III is a powerful and flexible data filing and retrieval system. All "database" systems require that your data is organised into fields and records. Unlike most, MASTERFILE does not commit you to field lengths or formats, since ALL data is variable-length and optional. Files are not pre-formatted, and only used bytes are saved to disc. Also, unlike the rest, MASTERFILE allows multiple user-defined ways of viewing/printing your data. And unique in its price range, MASTERFILE offers RELATIONAL FILE options, whereby common data can be entered just once and shared by many records. Maximum field size is 240, maximum fields per record is over 50, and maximum file size is 64K. Room for 1,000 full names and addresses, for example. Only one disc drive is required. It is menu-driven throughout, and comes with detailed illustrated manual, and example files.

SO VERY VERSATILE ...

Just about ANY kind of information can be handled by MASTERFILE. You can EXPORT the data to other systems (e.g. PROTEXT/MERGE and TASWORD). You can even merge your own USER BASIC to MASTERFILE for customised file processing, or build new files from other computer sources. The speed of SEARCH of MASTERFILE is second to none. Records can be sorted ascending/descending, character or signed numeric, even embedded keys such as surnames. Other functions are field-to-field calculations, and several-across label printing. We simply don't have room to list all the features; give us a call if you are still in doubt of the power of MASTERFILE III.



Summary of Business Assets

Description	Maker	Model	Value
Microcomputer, 64K RAM + 32K ROM	Amstrad	CPC 464	£199.00
Microcomputer, 128K RAM + disc	Amstrad	CPC 6128	£299.00
Disc interface and 1st drive, 3"	Amstrad	DDI-1	£149.95
Dot-matrix printer 50cps 80col	Amstrad	DMP-2000	£159.95
Executive briefcase	Antler	AT0109	£42.00
Wire paper clip	British Steel	BWC	£0.01
Answering machine	British Telecom	BT2836	£185.00
Photocopier, single-feed	Canon	PC-10	£650.00
String, ball of	[illegible]	DOS-Exec	£0.40
Executive jet aircraft	Lear	Cloud-Cuckoo	£5,200,000.00
Typewriter, electric	Olivetti	Leterra 36	£130.00
Dictation machine	Philips	510	£190.00
Coffee maker	Philips	HD5349	£30.00
Parcel scale	Salter	250P	£119.00
Microcomputer, 48K	Silicarn	Trumspec	£129.95
Letter scale	Waymaster	375KL	£10.00
Totals:			£5,202,294.26

Top record = 0001 [H] for menu

File: FILE2 Records:0016 Selected:0016 Parents:0000 RAM used:02K from 64K

ALL THIS POWER ...

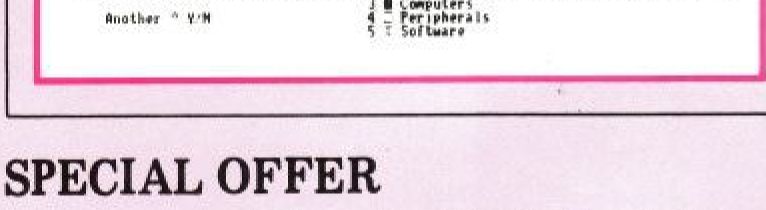
This is no toy thrown together in BASIC and half-tested, but real machine-coded computing power professionally constructed. We have had IBM and Apricot users beg us for a MASTERFILE for their machines — when they had seen the earlier CPC MASTERFILE. All this power is yours for ... **£39.95.**

For those who already have an earlier MASTERFILE, we offer updates; please telephone for details. You will be amazed at the performance improvements and extra functions.

★★★ PCW users: be patient, MASTERFILE 8000 will be ready early in 1987 ★★★

MASTERCALC 128 SPREADSHEET

We also have one of the fastest and friendliest spread-sheet programs around, MASTERCALC 128. Its unique features include: individual tailoring of column widths and precision; relocatable formulae; split-screen option; automatic cursor advance; text output to printer, or to disc for interface with PROTEXT or TASWORD; hi-res graphic histogram of any three rows. MASTERCALC 128 runs on CPC6128, or CPC464/664 with DK'tronics RAM. The price is just **£33.00.**



SPECIAL OFFER

You can save £10 by taking MASTERFILE III and MASTERCALC 128 for a combined price of just £62.95.

Prices include VAT and P&P to anywhere in Europe. Elsewhere please add 20% for air-mail service. ACCESS/VISA/MASTERCARD welcome, written or telephoned, quoting card expiry date. Make cheques payable to "Campbell Systems". Our normal response is return of post, 1st class.

CAMPBELL SYSTEMS Dept. (ACU)
7 Station Road, EPPING, Essex CM16 4HA, England. Tel: (0378) 77762/3.

The greatest show in town

The scene is set for the most extensive machine specific micro exhibition ever held. When the Amstrad Computer Show opens its doors for three bonanza days on July 10, it will mirror the company's continued dominance of the market.

For the latest statistics reveal Amstrad increased sales by 127 per cent to 1,750,000 units in the UK and Europe during 1986.

And the show will prove conclusively that the level of support is still growing to ensure the Amstrad bandwagon keeps on rolling.

For 25 per cent of the companies at the event will be first time exhibitors at an Amstrad Show, a clear indication that firms are still rushing into the market sector. Yet another clue from the show to the company's continued wellbeing is the move from Novotel – the location for the first seven shows in the series – to Alexandra Palace, so providing an additional 50 per cent of exhibition space.

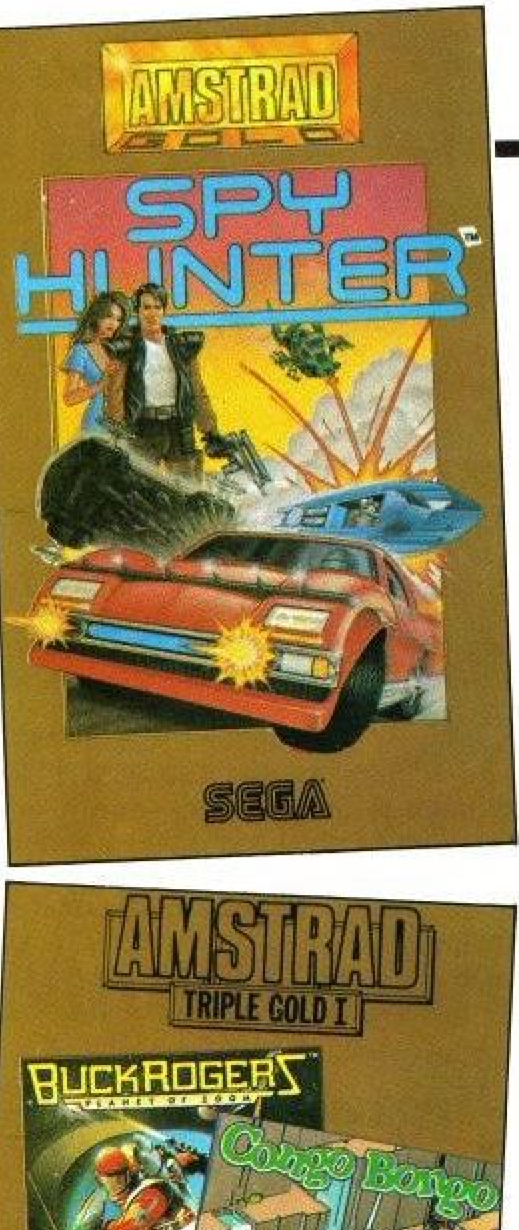
"It will not only be bigger but better than ever before in that it will reflect the escalating excitement surrounding Amstrad", says Derek Meakin, head of organisers Database Exhibitions.

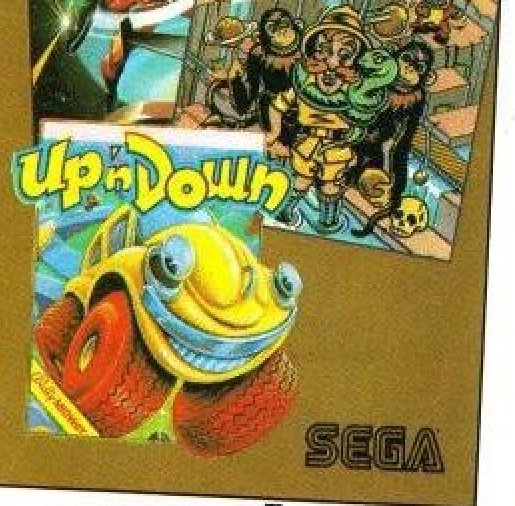
Arnor on the move

The Croydon-based software house who brought Maxam into the *ACU* office well over two years ago is to feel the Peterborough effect. Ten of the 13 staff are leaving London. Due to the rapid expansion of the company, which expects to turn over more than £1m this year, the need is felt for bigger buildings.

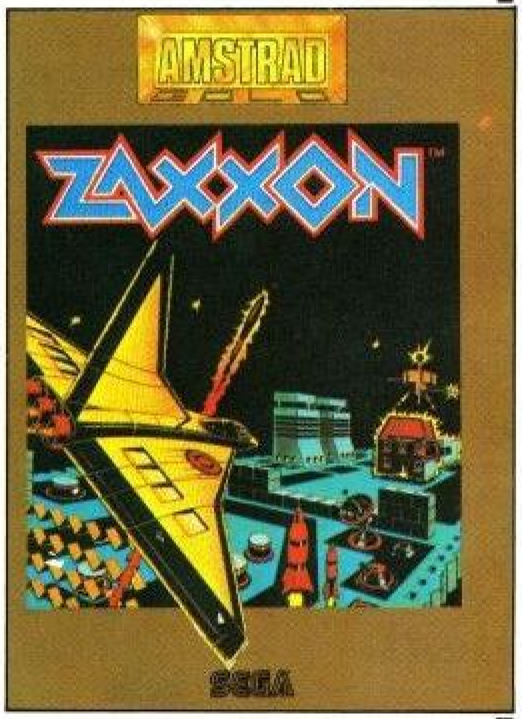
The next product will be Protext for the PC, for which the company has high hopes. In addition to the Peterborough office, Arnor is invading Europe.

Arnor Deutschland is the new German office, run by Nigel Holcroft. Future expansion into France and the US is being considered. The new address is Protext House, Wainman Rd, Woodston, Peterborough PE2 0BU.





Better late than never



Arnold owners with a good memory (more than 32k) will remember the Amsoft catalogue published in January last year. This contained a host of exciting new games based on Sega arcade machines. They may not be new now but they are still exciting, and what *ACU* has seen of them is really quite impressive. All the titles are being released on the Amstrad Gold label.

There will be three releases. The first will be a compilation of Up 'n Down, Buck Rogers and Congo Bongo. The second will be Spy Hunter, Sega's famous driving game, and last up is Zaxxon, the fab scrolling space game. In keeping with Amstrad's policy the discs cost only £2 more than the £9.95 tape.

Editing at your fingertips

A new low-cost desktop publishing package has been released for the PCW by Database Software.

Best known for its popular Mini Office, Database (061-429 8008) has produced The Desktop Publisher to exploit the full graphics potential of the machine to produce letters, flyposters, adverts, letterheads and company reports. It costs £20.95.

The double-sided disc contains three integrated editors for page layout, text and graphics; more than 100 ready-to-use illustrations, 15 different typestyles and a tutorial page.

The programs are driven by drop-down menus, worked by keyboard or mouse. Once the number of columns has been set, text can be keyed directly or loaded from a file created in Locoscript, or any other word processor, claims Database.

The built-in text editor can produce perfectly justified text, with bold and italic characters shown on the screen as they will appear on printout. This text can be repositioned at any time.

Artwork can be drawn in the package's graphics program. This has 16 fill patterns and font editor. Pictures from a video digitiser can also be accepted.

It can produce headlines up to four inches high and has a preview option which shows the page in miniature.

A complete system package is being offered at £79.95. It includes the software plus an AMX mouse and interface.


What BURGLAR 3 Fg

INSIDE THIS ISSUE
- Exclusive! Interview with Guild Librarian Sigismund Thing 2
- Guild of Thieves apprentice exam - how to take the test, and how to WIN! 11
- Top Secret Coded "Cheat Sheet" stolen from Guild of Thieves - we reveal all 24

AND MUCH MUCH MORE!

Top Crook Slags Rookies Shock!

Top crook Silas Beaker says the profession will face disaster if young newcomers continue with their boycott.

Beaker, speaking from his Dornbrook hideaway, added: "Frankly, the newcomers are rubbish. Greenhorns. Tenderfoot. Wet behind the ears.

"We just can't get the type of young person we want these days. Frankly, they seem more keen on accountancy and merchant banking."

Beaker was speaking on the eve of new, stringent entry standards to the Guild of Thieves.

"These new tests aren't easy", he said. "Anyone who can pass them is exceptional material, and faces a bright future in the Guild.

Beaker said that he was "sick as a macaw" with young apprentices training at the Guild's expense and then "going off the straight and narrow - becoming doctors and shopkeepers and such."

He added: "We have to face it. This a divided society. It's us and them."

TIME FOR ACTION

by Our Special Correspondent A.Nonymous

Commuters on the Dornbrook line are facing another expense today - the price of a wristwatch.

BURGLARY SUPPLIES
For the best in Modern Burglary equipment, call Festeron 1183
Jemmies & Crowbars
Dark Lanterns - guaranteed light-free
New range of striped clothing
(Ask for Brucie or Rod)

This adventure is a steal

Magnetic Scrolls soared to fame with The Pawn, the adventure which was sold by Rainbird. There you travelled through Kenovia, and this is again the scene of your return in the follow-up – The Guild of Thieves.

Cast as a thief you have to plunder Kenovia and store treasures in the bank, then... but I'm telling you the plot. Guild of Thieves comes with a copy of *What Burglar* magazine, which doubles as a scene setter and hint book.

Anita Sinclair, the boss at Mag Rolls, says "With The Pawn we produced the adventure with the best graphics and parser, but we have not rested on our laurels. With The Guild of Thieves we have concentrated on the plot to produce the best all-round game". Versions will be available for the 6128, 8256 and 1512.

User Club deal

A major deal has been announced between the 20,000-member Official Amstrad User Club and Currys High Street chain.

The electrical giant is offering three months free membership of the club with every Amstrad micro sold through its 530 outlets.

Members receive free copies of Amstrad Computer User, the club's monthly newsletter, substantial discounts on software and peripherals, previews of the hottest products around and the chance to enter big prize competitions.

The Official Amstrad User Club also provides a total software support package – from an inventory of titles through to back-up help. And it was this service which more than anything helped clinch the deal with Currys.

"We expect a substantial boost to membership as a result of the deal", says Jack Romano, the club's sales and marketing manager.

Virgin on the election

No, Nick Alexander is not standing as MP for Finchley, but Virgin has brought out a game to simulate the hustings. Without pausing to take a photo, the company has wheeled out a joystick-driven arcade simulation.

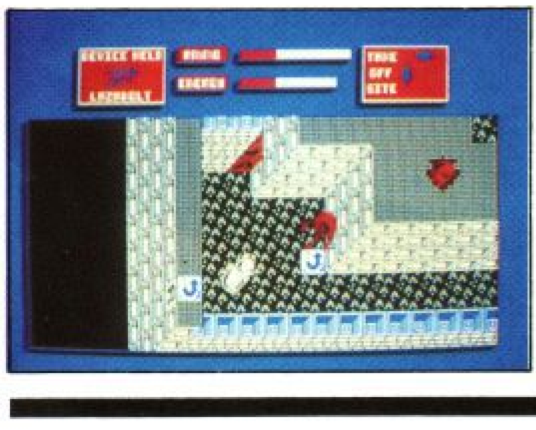
Four parties compete to canvass voters, collect manifestoes and bribe important people. Only one party will collect the magic 101 votes which will have Pickfords moving your chattels to Number 10.

Melbourne show some Enterprise

Despite being swallowed by Mastertronic, Melbourne House has some exciting new stuff in the pipeline. Enterprise is nothing to do with large whales and men with funny ears, it is a big space game.

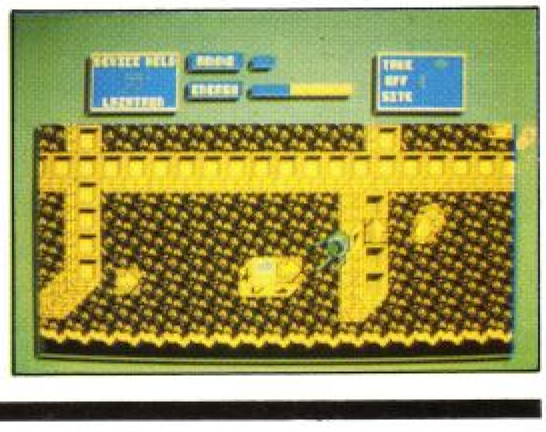
There are planets to visit, laws to break and police to outwit. Space trading is a major part of the game along with a flight simulator landing sequence.

Sounding a bit Elite-ish we will have to wait to see how good the program really is.

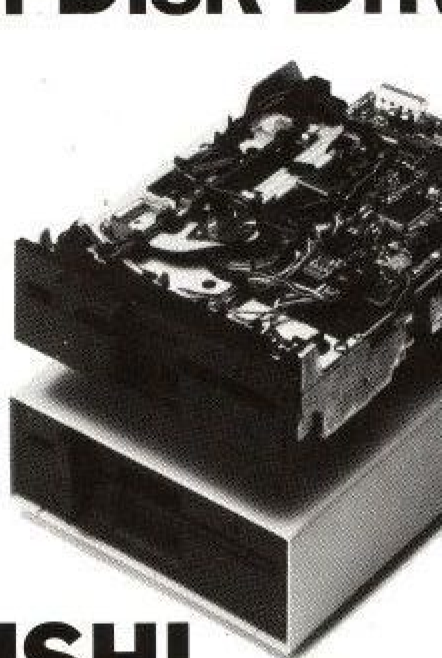


NIMROD is the new hero from Gremlin Graphics who makes his debut in its latest game The Final Matrix.

He has to rescue fellow members of the friendly Biopton race from a series of prisons – even though he doesn't know where they are – and fight off the evil Cratons.







GALLUP SOFTWARE CHART

Pos.	Move	Title	Comment	Last month	Market strength
1	Up	**BMX Simulator** *Code Masters* 1.99	Cycling simulator best played with a friend, a good fun game with low price but not the best buy around.	6	100
2	New entry	**Six Pak** *Hit Pak* 9.99	Proving that compilations are as popular as ever this has scorched a trail into the chart and can be expected to hold there for some time.	ne	93
3	Up	**Grand Prix Simulator** *Code Masters* 1.99	Super Sprint by any other name would still play as sweet. This is a bargain. Software speech and a good tune gild the lily. If this doesn't make number 1 something is wrong with the world.	15	82
4	Down	**Feud** *Bulldog* 1.99	First game on Mastertronic's new label. Chunky sprites and a mystic plot go to make up this 2D arcade game.	2	68
5	Down	**Big 4** *Durell* 9.95	Top notch compilation. Two excellent games, one good game and a totally new program. With this kind of value it is a surprise that Big 4 has tumbled so far from number 1.	1	63
6	Down	**Ninja** *Mastertronic* 1.99	The fist fiends on. This time with a more vicious trait and at a lower price. You have to fight off the hordes using a variety of weapons.	2	58
7	Down	**Konami's Coin Op Hits** *Imagine* 9.95	Take the best from the arcades into your home. Green Beret, Ping Pong, Hypersports, Mikie and the splendid Yie Ar Kung-Fu. Looking a shade dated now but a good blast all the same.	3	54
8	Up	**180** *Mastertronic* 1.99	Digital darts. You can't use the excuse that you need to steady your hand when you practice this non-intoxicating bar-room skill.	10	48
9	Down	**Gauntlet** *US Gold* 9.99	The only reason for this falling in the charts is that everyone has got a copy. If you haven't then your software library is incomplete. Go and buy Gauntlet.	5	47
10	New entry	**Four Great Games** *Micro Value* 3.99	A cheapie compilation. To think that some people thought that budget software would see the death of the games industry. Still, if they are such great games, why sell them at less than a quid each?	ne	46
11	Up	**Football Manager** *Addictive* 2.99	Just think – if you hadn't bought Football Manager all those months ago you would have saved a few bob. Still, you have given it a good run.	re	42
12	New entry	**Deeper Dungeons** *US Gold* 4.99	So everyone *has* got a copy of Gauntlet, and they are still playing it. More mazes and nastier nasties. Good to see that US Gold is not charging too much either.	ne	39
13	Non-mover	**Five-a-Side Soccer** *Mastertronic* 1.99	Football games have been around since the days of pong. Now a cheapie for the CPC keeps the trend alive.	13	38
14	Down	**Mini Office II** *Database* 14.95	Longstanding chart runner. A full suite of business programs for the price of a game. Ideal first look at sensible software but lacks the power for major applications.	12	34
15	New entry	**Head over Heels** *Ocean* 8.95	Surprising that this has entered the chart so low. It is the highest full price new entry but deserves a top five place at least. The next game from Jon Ritman will be a Match Day sequel.	ne	33
16	New entry	**Thrust II** *Firebird* 1.99	Thrust was simple with clear graphics, this has complicated matters. More is less, if you know what I mean. You are not sure what is safe and what will kill you. Useful physics lesson.	ne	32
17	Down	**Bomb Jack 2** *Elite* 8.95	This arcade hit improved with more strategy. Excellent special effects using colour switching, particularly good on green screen. Backdrops can get confusing.	16	31
18	New entry	**Leaderboard** *US Gold* 9.95	Bytes for the budding Ballesteros. This puts a 72 hole golf course in your computer. Ideal for armchair athletics. No bunkers but lots of water. Full 3D view of each hole with enlargement.	ne	29
19	Down	**Nemesis** *Konami* 8.95	Really exciting space shoot-'em-up. The options to increase your firepower makes this more than just another defender clone. Very difficult, but worth working at to see some spectacular sheets.	18	35
20	Down	**Five Star Games** *Beau Jolly* 9.95	Another compilation which is doing an admirable job of hanging in the chart. Spindizzy makes this a classic compilation.	17	35

Non-mover · Up · Down · New entry

JUNE 1987

Chart compiled by Gallup/MicroScope



Music Machine transforms the Amstrad into a powerful music computer.

It brings together all the features you'd normally buy separately. Sampling, editing, step sequencing, composition, MIDI, digital echo effect and much more. Or as Amstrad Action put it, "virtually everything you require for music composition."

Sound sampling, the latest buzzword, lets you record natural sounds with the microphone



supplied, then edit them and play them back at different pitches.

Or you can choose from eight internal 'voices' including drums and synthesiser; edit them, create new ones and play them from the

An Amstrad like you've never heard it before.

Amstrad or a MIDI keyboard. The sampled drum sounds "have to be heard to be believed" (Amstrad Action) and come with a Rhythm Editor.

For budding composers there's note, bar and tune editing. And for enthusiasts, a full MIDI specification that includes In/Out/Thru ports to connect with MIDI instruments.

Yet despite its power, the menu driven graphics and excellent manual allow sounds to be created and songs composed in minutes.

The price of all this magic? Just £49.95* complete with manual, microphone and demonstration recording.

As Amstrad User's reviewer summed it up, "a worthwhile hunk of technology for the price of four or five good games... Fun fun fun!"

To which we can only add, clip the coupon or pop into your nearest store and see it for yourself!

Ram Electronics (Fleet) Ltd, Unit 16, Redfields Industrial Park, Redfield Lane, Church Crookham, Aldershot, Hants GU13 0RE. Telephone: (0252) 850085.

*Disk version £59.95.
When used with a CPC464 and disk drive, an adaptor is required.
Music Machine is a trademark of Ram Electronics (Fleet) Ltd.

Please rush me Music Machine for the Amstrad.

☐ Tape version at £49.95 ☐ Disk version at £59.95.

Add £1 p&p (£5 Overseas). ☐ I enclose a cheque/postal order ☐ Charge my Access/Visa

Expiry Date / /

NAME

ADDRESS

POSTCODE

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24 hour despatch for postal orders and credit cards (7 days for cheques). Music Machine is fully compatible with the Amstrad CPC464, 664 and 6128.

Ram Electronics (Fleet) Ltd, Dept AU, Unit 16, Redfields Industrial Park, Redfield Lane, Church Crookham, Aldershot, Hampshire GU13 0RE.

Trade and Export enquiries welcome

RAM

FLARE TECHNOLOGY LTD

Available at WHSMITH Virgin John Menzies and all good computer stores.



Family files

I read with interest S. Rowden's letter about a genealogical data filing system, or rather the lack of one.

I too am doing family research. I have just had to make use of a standard database. Within its limitations it works, and I have found that by having one field for relationship to myself (coded as father's mother's father – fmf, and so on) it is possible to alphabetically sort that field and get each nominal line in its proper place across the span of ancestors.

As far as I know there is no family history program as such written specifically for any Amstrad machine. However, Mr/Ms Rowden may be interested in Computers for Family History by David Hagwood, published by Hagwood Computing at £2.

Although intended for researchers with no real experience of computers, it does give some idea of what can be done and what few programs are available for what machines – there is one for IBM compatibles. If someone has produced an Amstrad program I too would be very interested.

David Turner,
Rotherham, Yorkshire.

LD: *David Computer Software has some programs for genealogists. You can contact them on 061 439 4841.*

Disc driving

Just a quick letter. Firstly, to say the obvious, that I am impressed with the standard of your magazine. I cannot, however, recall ever seeing an article that deals with the disc system in any particular detail, in any magazine. If I tell you my requirements, perhaps you can help.

I realise that Amsoft has produced a firmware specification, but I'm not sure if this covers the Disc ROM software. What I require is the means whereby I can directly access the disc, for instance a cursor-controlled menu system for performing various operations on the various files on disc means that I must read directly from the disc.

For this kind of function, the CAT command is not a lot of help. Perhaps you could set me in the right direction, or even (dare I suggest it) tell me how to do it?

L.B.Sutherland,
Huntingdon.

LD: *As it says at the top of the page this is not the place for programming advice. But you do need the firmware guide – Soft 968 contains the Disc ROM information. The best way to find out what is on the disc is to redirect text output (#BB5A) to a buffer, perform a CAT, restore text output and read the text from the buffer into an array.*

Pixel Artist

I am interested in buying a graphics package for my CPC464 with mono monitor. Could you please tell me the best light pen package (preferably under £50) its capabilities and its price? Also, get rid of these pathetic 6128 owners moaning letters that complain about Firebird's games and how they don't load! One final point, which back issue has a review of Elite (by Firebird).

Toby Blackman,
West Sussex.

LD: *All light pens are going to have a hard time with the CPC green screen so try before you buy. The best pen around is the Dart fibre optic one. Which 6128 owners? Elite was reviewed in March 1986.*

Hidden options

I was wondering if any of the staff at *ACU*, or any readers, know how to get hold of a cloaking device in Elite? Apparently it is one of those toggles which aren't described in the literature but most people know about, like pause F to get into witchspace. I am extremely fed up with Asps which blink on and off the screen before I get a decent chance to fire at them!

Timothy Bell,
Dundee.

LD: *The cloaking device is awarded to you for completing a mission. I belive it is the one where you destroy a space station which has been overrun by Thargoids.*

Printer poser

I am the proud owner of a CPC 464 with a colour monitor and no disc drive. I have two questions to ask you: Could you please print a picture of a CPC664 as I have never seen one? And please could you give me the prices of the DMP2000 and the DMP3000 as I am thinking of saving up for one.
Roderick Stanley, (age 10),
Chichester, W. Sussex.

LD: *This is a 664. You wouldn't want a DMP3000 for a 464: The DMP 2000 costs £159 and includes a printer lead.*



Video vying

I have an Amstrad MP2 and it really is quite poor. I tried it with Xanagrams and the letters were quite inconsistent in colour – some were white while others were coloured, and there is fringing – hopeless compared to what I have seen on the colour monitor.

I have recently seen a demonstration of a CPC664 (like mine) at Currys, coupled to a TV by an MP2, and it was even more awful than mine. Is the MP2 capable of good reproduction – and if it is how does one achieve it?

A second question – has anyone been enterprising enough to produce a really well-equipped TV tuner for the CTM644 monitor? One with proper audio/video input and output (to allow, for instance, direct video titling, and the use of external amplifiers and speakers) and Teletext which many standard sets do not have?

I queried DK Tronics but was told there are no such plans at present. I would have thought such a unit would give a positive inducement to buyers to make double use of the monitor with really high quality TV output, even if they already have a standard colour TV.

Incidentally, what is your opinion of the CTM664 as a colour TV with tuner – is it as super as DKT would have us believe?

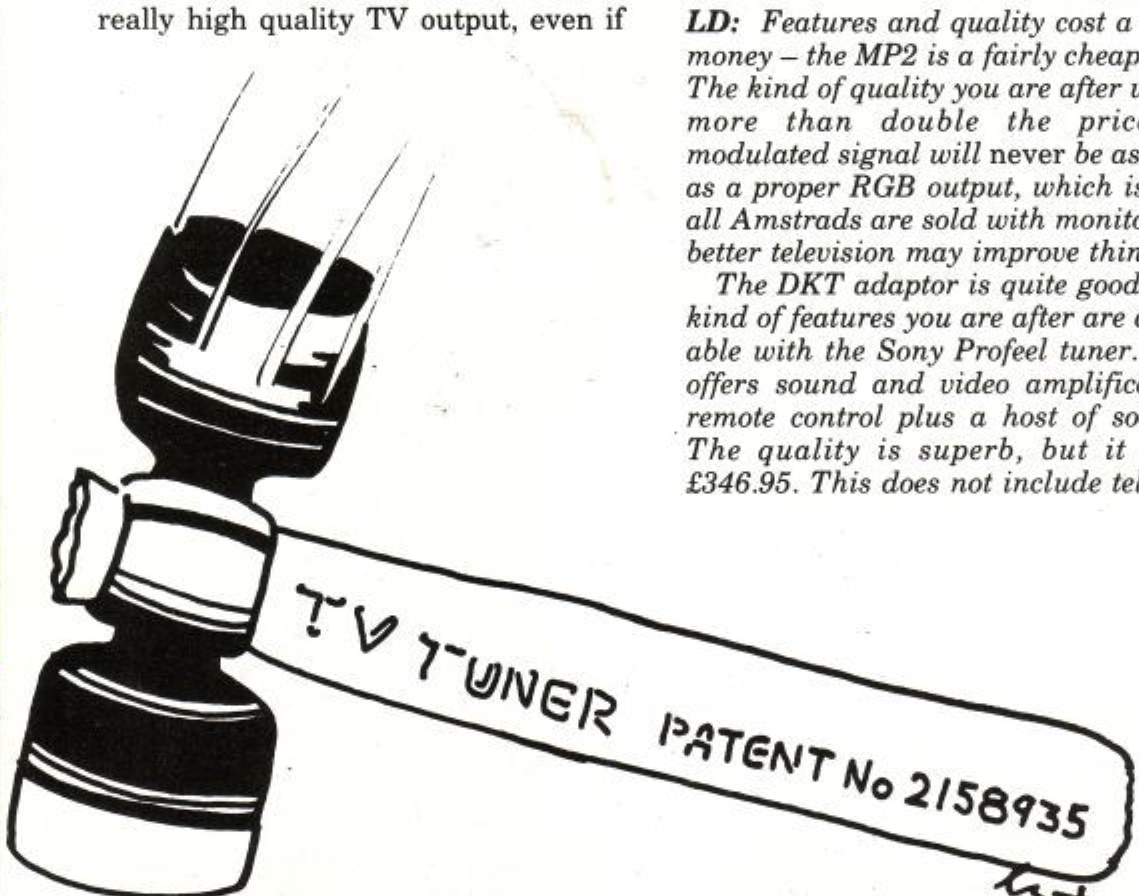
Finally, is there a way of linking two CPC664s to use the disc from one as a second disc for the other? I ask because my son also has a CPC664, and such a linking could be useful on occasions, and save buying an extra disc drive.

David Hutchinson,
Swindon.

LD: *Features and quality cost a lot of money – the MP2 is a fairly cheap unit. The kind of quality you are after would more than double the price. A modulated signal will* never *be as good as a proper RGB output, which is why all Amstrads are sold with monitors. A better television may improve things.*

The DKT adaptor is quite good: The kind of features you are after are available with the Sony Profeel tuner. This offers sound and video amplification, remote control plus a host of sockets. The quality is superb, but it costs £346.95. This does not include teletext, an extra which costs £161.95.

As with anything you get what you pay for. It is not possible to share a disc drive between machines.



Sounds good

When my CPC6128 arrived, I was excited about the fact that it could play all music and noises in true stereo. But the only way that I could find to connect my stereo and my 6128 together was by using the microphone socket on my stereo connected to the computer with a 3.5mm jack plug, which produced far from satisfactory results.

The music being played by the computer came out of the stereo speakers distorted, and channel C (accessed by entering SOUND 4,.....) was very quiet. As this is the main channel used in most software, I was very disappointed.

Suspecting that the lead was faulty, I had another made up by a qualified electrician. When I played music on the 6128 using this new lead, it sounded, once again, completely awful. Please help me! Does anyone manufacture the correct lead? Could you tell me how to make it correctly?

With regard to the high-impedance headphones, where can I buy them, and in what way are they different from the headphones normally used with stereo systems?

Jason Anderson,
Swansea.

LD: *A very helpful bod from Amstrad Customer Services told me that Tandy is familiar with this problem and can supply all the necessary bits.*

The facts of life - for CPC owners

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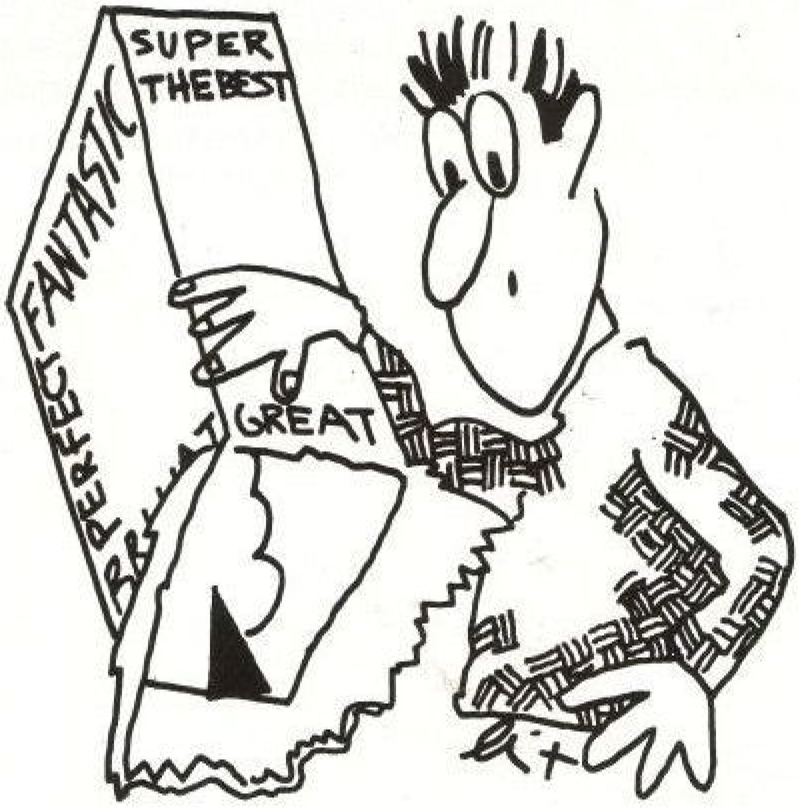
Arnor Limited, *Protext House, Wainman Road, Peterborough PE2 0BU*

Unfair description

I have recently bought one of Elite's games, Space Harrier – I was attracted by the tremendous screen shots shown on the rear of the case. Once it was loaded I was presented with a sketchy, cheap vector graphic screen and I felt utterly disappointed and cheated. I had spent £14.95 on a game that I didn't want. The shop suggested I send a letter of complaint, which I did – in vain.

B.G. Hart,
London.

LD: *Inlay cards are often printed before the game, so the software house can sell the program more quickly – but is often misleading. I happen to think that Space Harrier for the CPC is excellent, and vector graphics are not "cheap". You could try shouting about trading standards and the shop would give in. A good dealer will let you try a game first.*



Colourful dumps.

I am interested in buying a graphics package for my 6128. I was going to buy either the Advanced Art Studio by Rainbird or the Electric Studio 6128 light pen – which is the better? Also, could you recommend a colour printer that would work with one of the above graphics packages?

C.F.Mulcock,
Clanfield, Oxon.

LD: *Neither of the above packages supports a colour printer, but you can always save the screen and then load it on its own for dumping. The Okimate 20 colour printer is quite good and cheap to buy (although pricey to run). It comes with software written by our own Hairy Hacker to produce pretty Arnold screens.*



Bad advice

I have just bought an Amstrad CPC6128 with green screen. I feel I'm not getting the full benefit of the computer, as I can't use the colours. Could you give me the address of the manufactures of an MP2 as there are no dealers in my area who have any.

Also, when I got the computer I got a serial 8056 printer as part of the package. However, I can't get the printer to print from the computer. The assistant at Dixons told me that I needed a certain code to operate the printer – I tried it and it didn't work. Could you please help me as I'm pulling my hair out over this.

J.McCluskey,
Inverkeithing, Fife.

LD: *You can order an MP 2 from the User Club on (091) 5673395 – I would normally recommend you try your local Dixons. A serial printer requires an interface, such as the Amstrad RS232. Even with this it is not going to be a simple matter to use the printer: The exact process depends on which serial interface you buy.*

Protext procrastination

Another letter about Protext? Yes, well as a CPC6128 user I was pleased to hear about the CP/M version in your February issue, but I was sorry to see the review addressed mainly to PCW users.

The *ACU* review said very little about the comparative merits of the CPC, CP/M and Rom versions of Protext, nor does David Foster who gives useful hints in the March issue, and praises your review in May.

Are CPC users no longer catered for in *ACU*? Where else? Unfortunately, Arnor doesn't answer letters, whether asked about the cost of upgrades or told about the malfunction of the >OC stored command, when used to redefine characters.

Not enough that these characters are extremely difficult to place, since the >OC command transposes the side margin and ignores the last ruler used, but it also has a disastrous effect on single sheet and block printing – the nearest thing to a printer going berserk. The same printer codes do work using SETPRINT, but there is not much room there and it upsets right-justification.

Can you, or Arnor (which is so coy about the price of upgrades), or any of your experts, advise on this and say whether versions later than V1.21 or the CP/M version avoid this bug? It certainly spoils an otherwise excellent word processor.

Dr.H.P.Stadler,
Newcastle.

LD: *PCW owners are expected to read APC, the differences between Protext CP/M on a Joyce and an Arnold are minimal. I am surprised at your comments about Arnor, which has a reputation for being one of the friendliest software houses and for prompt replies to letters.*

The OC command controls the printer. I suspect you are sending the wrong codes to cause it to play up. Arnor charges £5 for upgrading from one version of a Rom to another and offers a £20 discount to anyone upgrading from Amsdos to CP/M versions of programs.

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*CPC 464 and 664 requires DK'Tronics 64k ram

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The friendly touch

Impossaball, a stunning 3D game which scored some of the highest marks ever in *ACU* has brought Hewson to the fore. But before the 'ball there were some splendid programs and small beginnings as Jerry Muir found out.

While some software houses are constantly struggling to attract attention, others are quite happy to generate genuine affection. I've always had a soft spot for Hewson and it's a feeling I share with a lot of other people.

There's something about the company that creates a sense of loyalty, both from those of us who await each new program in the sure knowledge that we're not going to be ripped off, and from its team of top line programmers, who choose to stay with the people who have allowed their talents to develop at a natural pace.

That's why it was a pleasure to grab an Awayday ticket and take the Great Western Railway to Didcot, deep in the Thames Valley and only a few miles from Oxford. "Don't say we're based in Didcot though," Julia Coombs laughed, as she collected me from the station. "People only ever think of the power station. Say we're in Abingdon".

Actually the Hewson HQ is just outside the tiny village of Milton, on a trading estate, like so many medium-sized software companies. Its offices are already bursting at the seams, with shelves of files and computer magazines spreading into the reception area, so the programmers have been moved into a Portakabin round the back. Andrew Hewson's company hopes to expand into neighbouring premises to gain some breathing space.

In terms of staff, Hewson has grown incredibly since its early days, but retains a friendly feel as it's still small enough for everybody to know everyone else. There's a real feeling of people enjoying their work because they can see the results of their contribution to the company.

Everybody keeps busy too – in fact Andrew Hewson was so tied up with company matters that we only had time for a brief chat. But he left me in the more than able hands of Debbie Sillitoe, who has been with the company since 1982 and was only too happy to answer all questions.

Early memories

"So tell me the history of Hewson," I asked. Debbie and Julia burst into laughter. "That's a nice easy one to start with," Debbie chided. However, she had a go. "Andrew started the company in 1980 from his back bedroom as a small, mail order, classified-ad type set up. And then he wrote his books, which were The Forty Best Machine Code Routines and Twenty Best Programs".

This all brings back memories of those early days of home computing, before programmers had started to amaze us with incredible code. Then hackers would happily sit around typing in listings for a game of flickery Invaders. How things have changed!

"The first program was a toolkit for the ZX81", Debbie continues, "and Pac-Man . . . no Puc-Man for the same machine". So don't ever let anybody tell you that you can't have games on a machine with no sound and block graphics. Hewson also sold packs for Sir Clives 1k wonder.

"Then Andrew's brother Gordon joined the company and ran it full time, because Andrew was still working at the Institute of Hydrology, or whatever it's called". In those days Hewson had Consultants tagged on to it, which always made it sound very businesslike. There was once an intention of developing a more serious side, but as the games took off it became obvious that that was where the company's fortunes lay.

Hewson was ready to move into a small office in Wallingford. It was still doing mail order business for the most part, but slowly the shops took over. "Then Heathrow Air Traffic Controller and Night Flight came along", Debbie



Firelord



Dragontorc hits the Amstrad

recalls, "and they were very big money spinners for us".

These were the first programs from Mike Male, who works as an air traffic controller and only programs in his spare time – "and not vice versa," Debbie was keen to stress. Heathrow International ATC followed, adding a second airfield.

In fact Heathrow ATC is still bringing the tenners in to land, as it's just been released on the PCW. On the second side of that disc is Southern Belle, a more recent Male masterpiece, written in conjunction with self-confessed railways freak Bob Hillyer.

If you've ever dreamed of being at the controls of a steam train surging along the London to Brighton run, then this is for you. Mike Male is currently at work on another tribute to the iron horse, aptly entitled Somerset and Dorset. Debbie tells me it's known as "Slow and Dirty – Bath to Bournemouth."

Fortunate adventure

In those days programs were just sent in for evaluation on the off-chance, but Hewson struck lucky with the people who came to them. There were a couple of adventures which were very highly regarded, Quest and Fantasia Diamond by Kim Topley. Only the second of these made it to the Amstrad, but if you're into the genre why not drop Debbie a line – she may still have a few copies hanging around on a dusty shelf.

It's always been hard to pin Hewson down though. The company has never tied itself to any one genre and before it became labelled as a simulation specialist or adventurers' hangout, it had moved on.

The one thing that Andrew and his team have always looked for is quality, whatever the type of program. They next found it in a shoot 'em up called 3D Space Wars, which was sophisticated for its day. But perhaps more important than the program was the programmer. This was the start of Steve Turner's association with the company, a partnership which has resulted in a clutch of brilliant games.

It was autumn 1983, Andrew Hewson had joined the company full-time

and the one office in Wallingford had expanded into two grotty little rooms, according to Debbie. But business was booming. Steve Turner completed his trilogy with 3D Seiddab Attack (try spelling that backwards) and 3D Lunar Attack. 3D was very much the buzz word at this period.

These three never made it to the Amstrad, nor did Mr Turner's next offering, the immortal Avalon. But we haven't been robbed of its sequel, Dragontorc, which again features the fantastic Filmation technique that lets you steer the wizard through a 3D landscape. It's a technique that has seldom been bettered for arcade adventurers.

Technician Ted took a far more traditional approach. It was very much in the Manic Miner mould, but its quirky humour and some fiendish puzzles made it a real crowd pleaser. The loading routine animated some men while the rest of the program was sucked into ram, a neat trick.

Hewson was now firmly on the map and a force to be reckoned with, but resisted the temptation to throw a lot of product at the public in the hope that some would stick. Quality still ruled, okay!

The company did maintain a high press profile though. Launches took place in such exotic locations as The Museum of London, where Dragontorc was revealed to the waiting journalists among real Roman and medieval remains. They even brought along a golden torc for the occasion.

With some software houses, accusations of hype would fly thick and fast, but not with Hewson. As Debbie says: "There's no point spending months producing a game then hiding it from everybody, is there? We're producing good enough stuff to get good reviews for it. I mean, if you've got something to hide about your product, you don't want anyone to see it, do you?"

Approachable Arnoldbashers

That friendly approach isn't restricted to journalists, either. It can't be every software company that gets fan mail, but Julia receives regular letters from satisfied customers requesting information about future releases.

Another thing that's striking about Hewson product is that it appears on time and isn't beset by the bugs that suggest a last minute panic. Debbie says that everybody is extremely conscious of this. "That's what's given us a good reputation and it's because we're using top quality programmers. We're using the people who know the



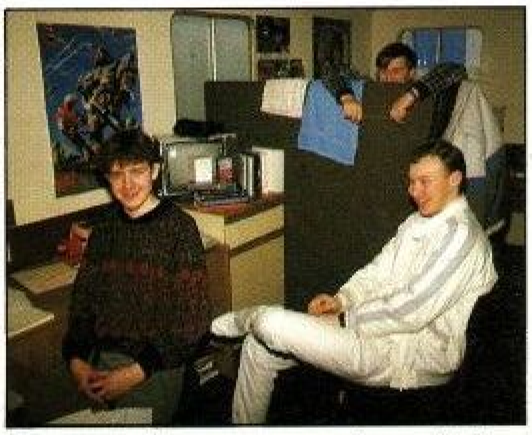
Julia Coombs



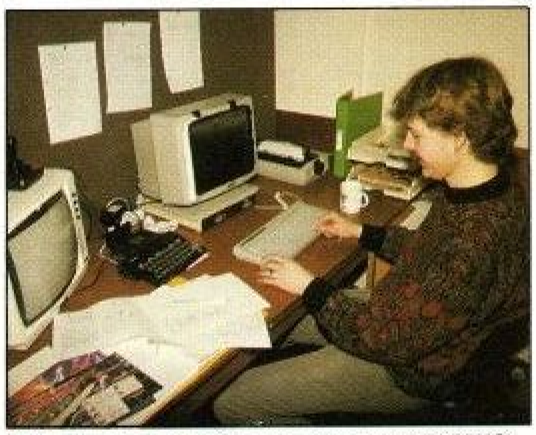
Andrew Hewson



Debbie Sillitoe



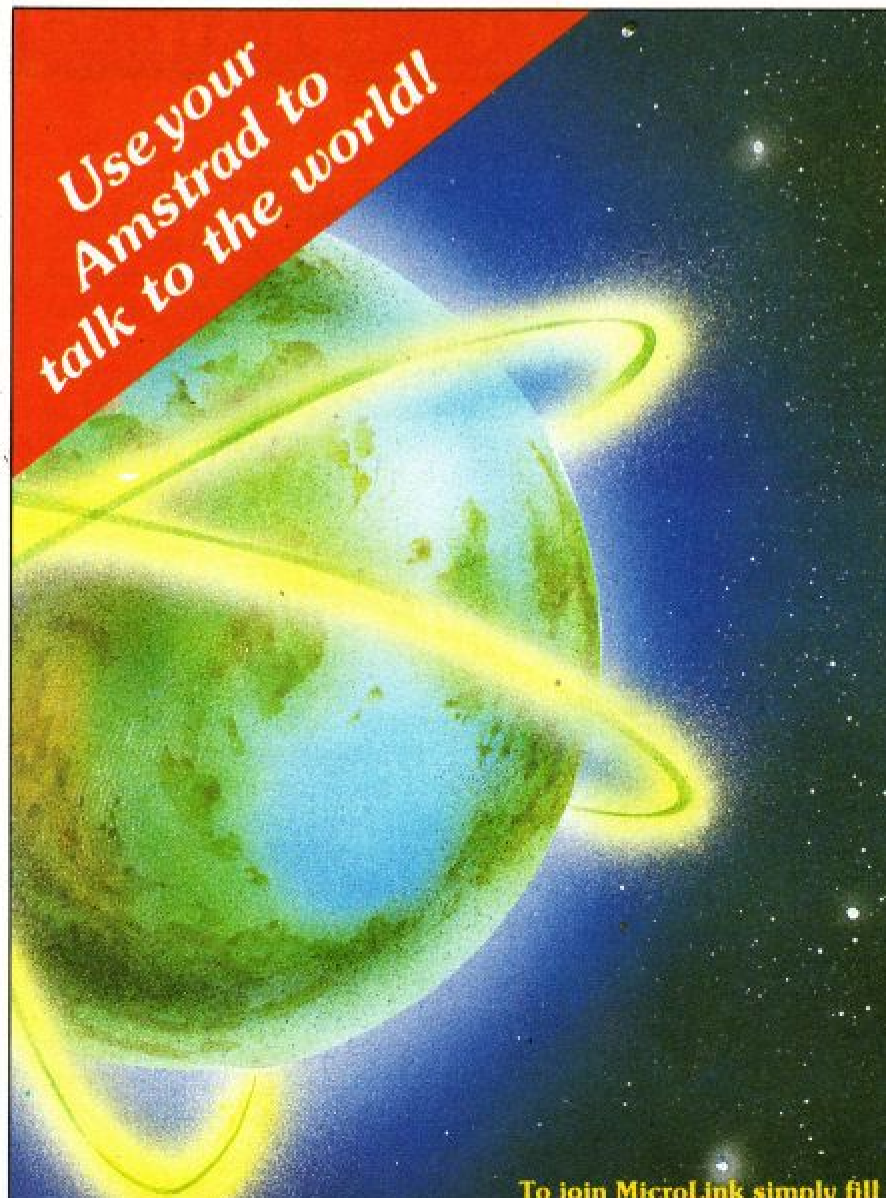
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machines. And they are top quality programs."

There's also a safety-valve built into deadlines, because, as Debbie confesses, there are always going to be problems.

Astroclone, Paradroid and Gribley's Day Out were the next releases to swell Hewson's reputation, but sadly they never made it beyond the Spectrum and Commodore. In fact, if there is a reason to grumble about Hewson it's that some superb programs never get converted. One reason is that they wouldn't want to put out a sub-standard product, just to cover all the machines.

But there is good news for anybody who feels deprived of that ace, fast flying shoot 'em up, Uridium. Now that the Spectrum version has been so successful, there aren't any technical reasons why an Amstrad version shouldn't appear. The bad news for all us Amsters is that the next version will be for the ST. Andrew Braybrook was on his way back from the States, where it's being programmed even as we spoke.

Recently Hewson has added some new programmers to its roster. Steve Crow produced the amazing Firelord with its scenes of trading and trickery, while John Phillips has driven everyone dotty with Impossaball, a brilliant piece of problem solving as you try to steer a sphere along a complex 3D course. Meanwhile old timers Steve Marsden and David Cooke, of Technican Ted fame, took time off to produce City Slicker.

At this stage Julia suggested I should take a look around, and I jumped at the chance, because I was fascinated by what sounded like a mechanised guillotine going about its gory business in the next room. Is that the secret of their quality, I wondered. Does Hewson execute programmers for sloppy work?

I had to wait for the answer though. The first stop on our whistle stop tour was the programmers Portakabin. It was fairly empty when we called in, with only three people there, but as Dominic Robinson, one of Hewson's full timers assured me, it gets pretty crowded when freelance programmers come to visit.



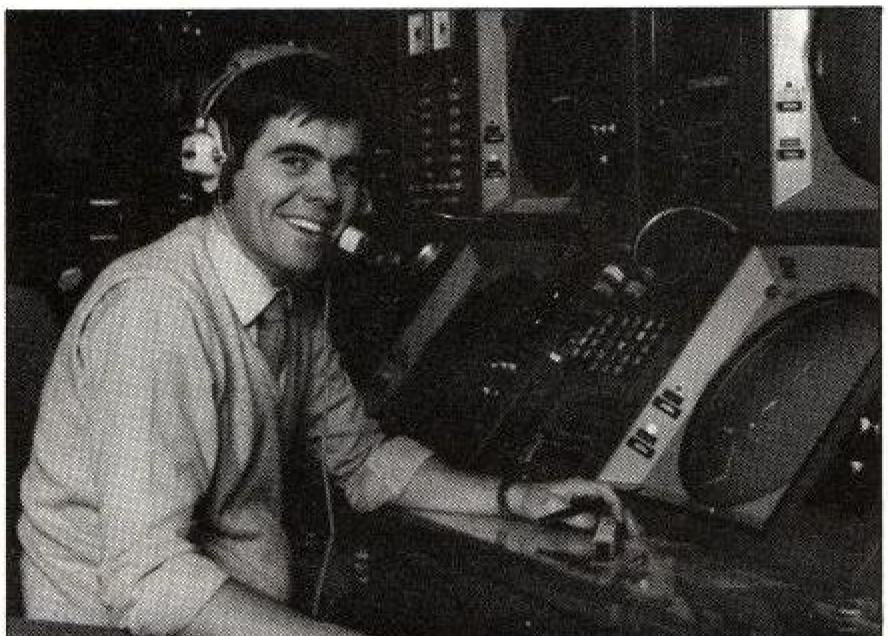
Steve Turner

The Joyce of coding

I've seen lots of programming rooms in my time, but this one took me by surprise. The first thing that caught my attention was a line of Joyces. The Hewson in-house hackers all work on PCWs, interfaced to CPCs, Spectrums and even Commodores via their RS232s and various interfaces. This gives them reliable disc drives, plenty of memory and a choice of editors and assemblers to compile their code.

Next we stepped into the warehouse, working overtime with the mailout for Ranarama, Steve Turner's latest program. Its shelves hold stocks of every program – even the extremely obscure Countries of the World for the BBC.

Phone calls still come in from people wanting copies of those early programs too. Though most of Hewson's business is now through the shops, there's still a fair volume of mail order, in particular for Southern Belle, which rather took the company by surprise.



Mike Male author of Southern Belle at his console at Heathrow Air Traffic Control Centre.

That noise . . .

Finally we stepped into a small side room, and I learnt what was making all that clunking. Hewson does all its own duplicating and the noises were emanating from a strange piece of machinery in the production process.

First the tapes are duplicated from a master on to huge "pancakes" of cassette tape. Next that tape is fed off its spool into the noisy machine, which is constantly fed with C-0 cassette cases – so called because they hold no tape. The machine takes the tape, automatically splices it onto the red leader, cuts it to length and makes a second join before dumping it into a box ready for labelling.

It will grind out around 200 copies an hour, which means that it works overtime when there's a new release. I found something strangely satisfying about watching this little robot at work, and as it hissed away, I was reminded that Andrew Hewson's background is in hydraulics.

That machinery had better be reliable, because Hewson is now aiming for one release a month, which means that it's got a lot of cassettes to fill before Christmas.

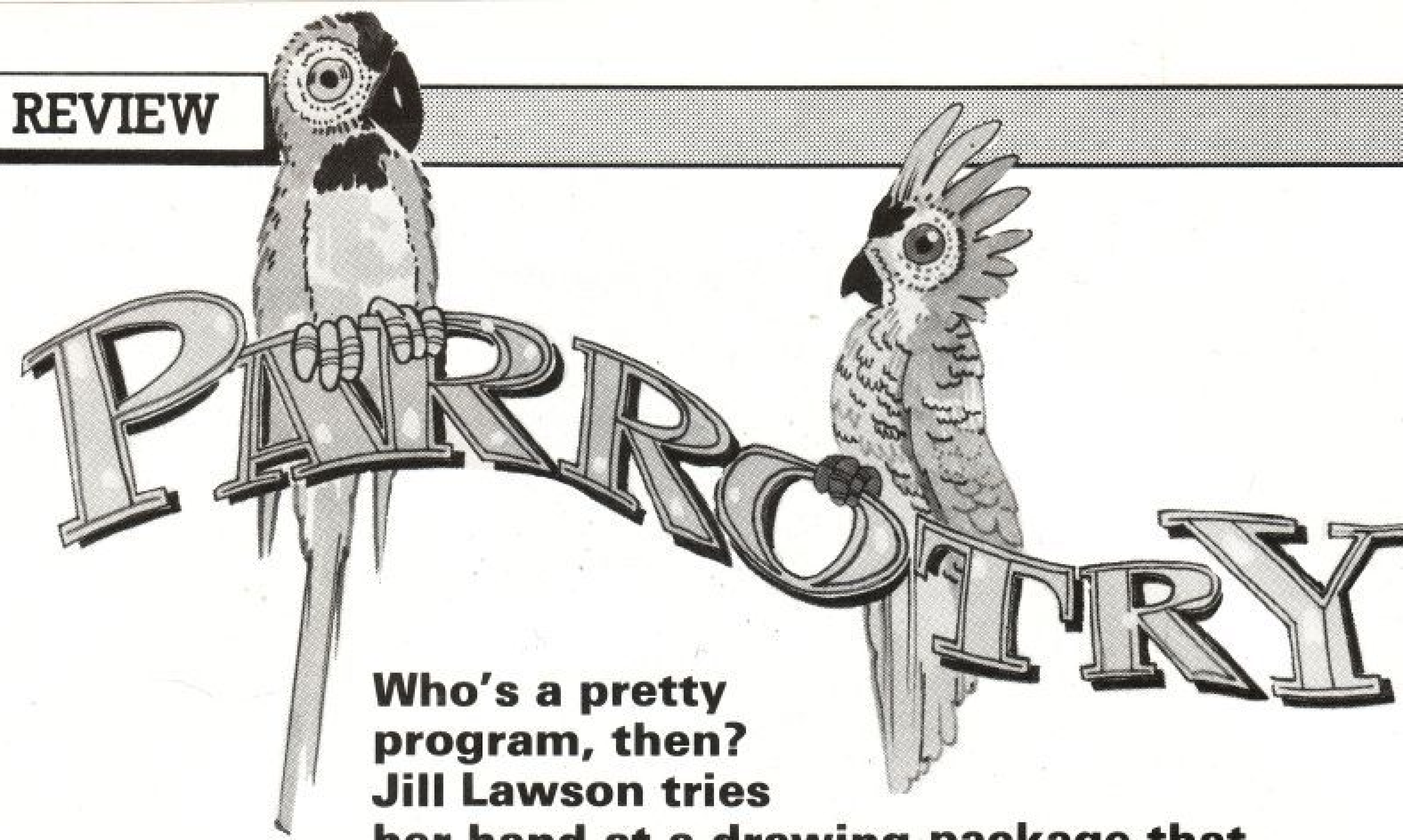
Apart from Ranarma and Somerset and Dorset, which is scheduled for September or October, there's Zynapse, a zapping game which is still being written, but which should be out in summer sometime. Perhaps it will make amends for the absence of Uridium.

Then Debbie and Julia treated me to a sneak preview of Exolon, a new game from Rafelle Cecco, who first came to fame with Mikro-Gen's Equinox. You take the role of a heavily armoured humnoid, blasting, battling, bounding and blundering through several hundred screens of action with an amazing array of weapons. There's a straightforward, front firing laser, and a backpacked missile launcher.

From my brief look, two things were obvious. Rafelle's graphics are every bit as good as they were in his previous program; the explosions are probably the best I've ever seen. The other thing is that, from the way everybody crowds round to have a go at the demo game, it's terrifically addictive.

Hewson is just as happy a company as I'd hoped it would be. I read a note I made of something that Julia said as she drove me back to Didcot,and it seems to sum up the Hewson philosophy! "It's nice if you never lose that attachment to the personal scale. You never lose sight of what's down the line."

If only all software houses could remember that!



Who's a pretty program, then? Jill Lawson tries her hand at a drawing package that can produce animated displays

From time to time, among the more conventional art utilities, one finds an oddity, a program that approaches the whole business of putting pictures on your computer screen in an entirely different way.

Normally a finished design comes up on your screen as a complete entity, whereas, in Parrotry, from Treasure Island Software, each operation is repeated as it was originally performed so that you can see the picture building up and being filled with colour.

Operating on CPC 664 and 6128 computers only, in a choice of Modes 0 and 1, it also has the ability to repeat sequences and to produce animated displays.

The introduction to the slim manual makes a virtue of eschewing the use of gimmicky menus and mice, so on loading up the screen goes black, displaying a number of letters across the bottom.

The various functions controlled by the appropriate keys are listed in order. For instance, B changes the border colour, C, the initial ink colours (a pity that, when the manual said single digit numbers "may" be prefixed with an 0, they had not made it clear they meant "must").

Pressing D puts you into drawing mode, and the display changes to offer two basic drawing options; COPY plots points/lines and C now draws a circle (limited to those with a radius in excess of 28 pixels).

It is possible to add a delay to ink changes to obtain special visual effects. Solid fills can be performed, and there is a facility to add standard text. The last drawn line, fill or addition of text can be deleted if done immediately.

Anyone more used to complex drawing programs with a variety of pens, brushes, sprays, boxes, triangles, ellipses, windows, customised pattern fills, a wide choice of text sizes and

Parrotry Plus

Parrotry Plus is an enhanced and more expensive version of the original utility. For those who have the original program, Treasure Island will offer "an advantageous deal to update".

The major change is the introduction of a data handling facility with which either the whole, or a selected section of the drawing can be manipulated in a variety of ways.

In addition to the ability to scroll the display horizontally or vertically (a last-minute extra included in Parrotry), you can now reverse, invert, rotate, and change the size of the display in the horizontal and/or vertical plane by a factor in the range between 0.25 and 4.

Increasing the size by 2 or 4 provides a zoom facility of sorts for detailed work, reversible with a subsequent equivalent decrease.

Vertical lines may be slanted by up to 48 degrees to left or right, and with a bit of ingenuity, horizontal lines may be similarly altered.

Sensibly, you are advised to save a design before attempting to manipulate it, and to delay the addition of fills and text until your drawing is completed, especially when using change size and slant commands.

Parrotry Plus has been extended to include Mode 2. A second character set is available; and several minor alterations have been made to standardise procedures and make the utility more user friendly.

A supplementary series of drawings, based on a picture of a PC 1512 demonstrate all the various data handling commands clearly enough, though I can't imagine anyone could possibly want a picture of an upside-down, reversed or elongated airo could they?

There is promise of a Parrotry library to come, containing useful shapes, an alphabet set and maps and so on which can be merged into your own designs.

While the new, improved Parrotry Plus still falls a long way short of sophisticated drawing utilities such as Advanced Art Studio for any straightforward screen design work, it incorporates some interesting possibilities for special effects, and is certainly economical memorywise.

styles may not be willing to accept the challenge of producing viable drawings with a minimum of tools.

Users are advised to start with a simple drawing, and are thoughtfully provided with a couple of re-useable sheets of acetate and a marking pen for tracing designs to attach to the screen as a guide.

Everything drawn is stored in arrays, and pressing E in the main menu enables alterations to be made. Lines can be changed, deleted, inserted or nudged to manipulate the original drawing. An explanation of the array organisation is contained in the manual.

A sequence of functions may be looped to repeat any number of times and anywhere on the screen. The program displays the current coordinates after each cursor move in draw mode, and a grid can be superimposed to help with accurate positioning. At any time, re-draw allows a review of work to date, and slow re-draw makes it easy to determine where changes should be made.

Files can be saved on disc and reloaded later. Because of the methods used, pictures created in this way are very economical on memory. Also there is an option to save as a normal screen.



Parrotry: Ideal for illustrating programs for young children

Parrotry comes with a quite impressive series of demo pictures ranging from a four stroke petrol engine to a fly-catching lizard, which give the user a fair idea of the sort of thing that can be produced once one has got to grips with the necessary procedures.

I thought this was a very interesting concept and one which I would like to explore further, but it is a utility which would appeal perhaps more to the mathematically-minded than the straightforward graphic artist.

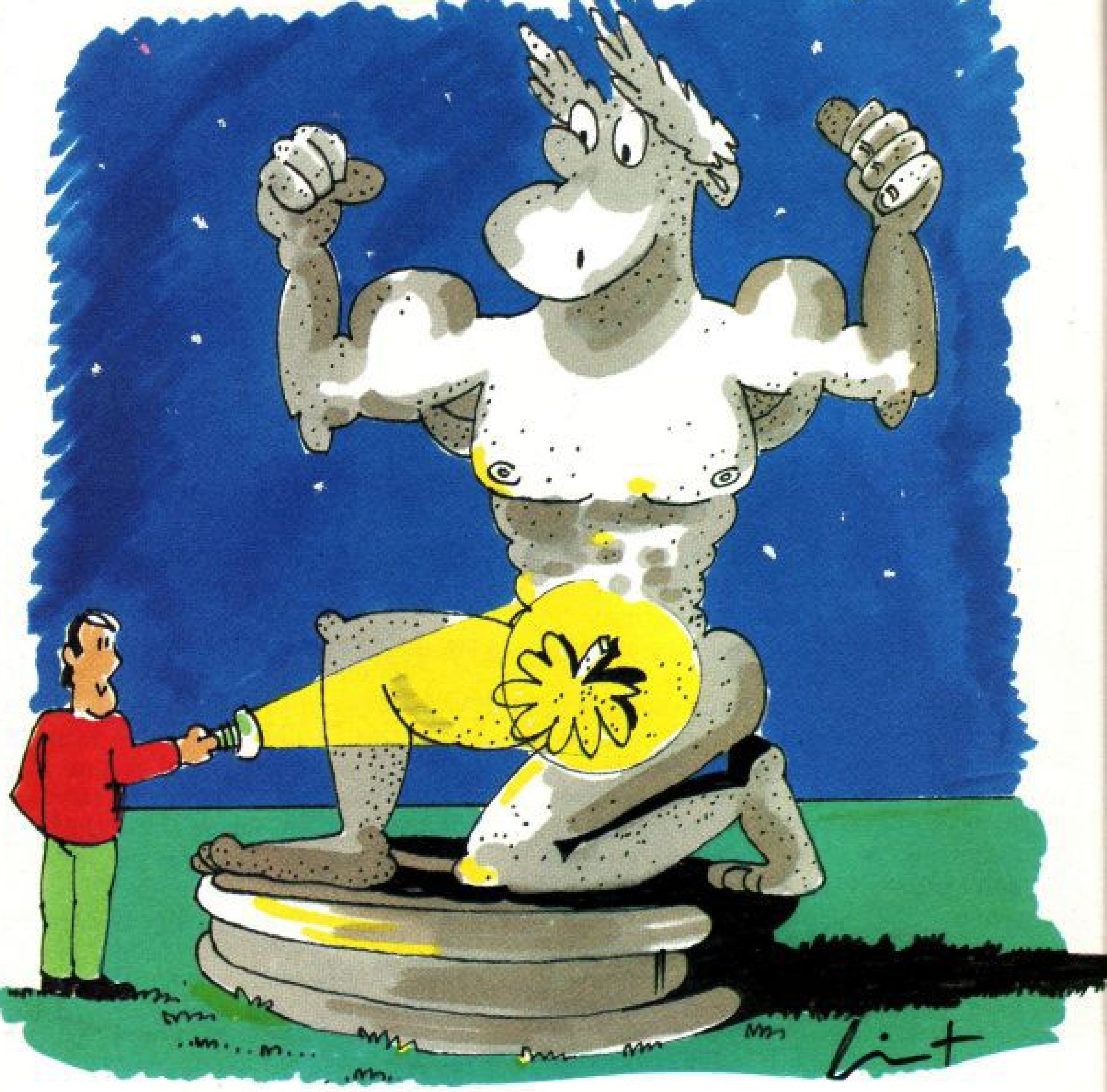
With only single-colour fills and no spray or zoom option it is not suitable for detailed hi-res work, but would be useful for display sequences.

Parrotry
Treasure Island Software,
14 Arthur Street, Ampshill, Beds.

ACU



Seek and ye shall find..



Into adventures with Bill Brock

Any adventure buffs worth their salt just have to drool over the Infocom range of adventures. They are rarely easy, have no graphics, display reams of highly literate (if Americanized) text and are illogically logical all the way through. Starting years ago with the highly popular Zork Trilogy that were really enormous treasure hunts, they then progressed to more complex plots that include Witness, Suspect, Trinity and of course the incomparable Hitchhiker's Guide to the Galaxy. Sadly, all these marvels can only be enjoyed by disc users – if you don't have a disc drive, you had better go out and get one as soon as possible!

It is said that everything goes in cycles and one of Infocom's latest games is back on the theme of a pure treasure hunt – Hollywood Hijinx. Set in the glittering capital of the movie world, this game has all the atmosphere of a cinema spectacular of the thirties.

You play the nephew of two Hollywood idols, Buddy Burbank, the creator of hundreds of box office bonanzas and his wife Hildegarde. Buddy died some time ago and now, on the death of your Aunt Hildegarde, you stand to inherit a fortune. Nothing in this life is certain, and you have yet to earn your inheritance. You may be the favourite nephew, but in true Hollywood fashion the drama has only just begun.

Aunt Hildegarde's will sets it all out quite plainly: You will inherit – providing that you can find 10 "treasures" in the next 12 hours. The treasures are all items made famous in Uncle Buddy's films and are hidden in or around their palatial home. You have a flashlight, a poem by Buddy, a letter from Hildegarde and it is night-time – you had better get moving.

There is very little I can say about the operation of an Infocom game that has not been said before. The packaging is excellent, with lots of background material to get you in the right mood, complex input commands are accepted, the text creates a great atmosphere – and has anyone ever found a bug in one of these games?

This one gives the impression of being easier than most of Infocom's previous adventures, even to giving you a rough map of a very novel but gigantic hedge maze that has nearly 180 locations. The Hollywood Spectacular theme is maintained throughout, with giant Rambo-type statues, hidden lifts, a field sized patio, doorbells that play movie themes and a loaded cannon that just has to be fired. Watch your mapping carefully as several locations are either bigger or further away than you may think. Moves in the maze vary from 10 to 70 feet, so keep your wits and pencil well sharpened.

Infocom's range of commands is slowly growing. We have had SCRIPT, the ability to create hard copy on a printer, for some time, but OOPS is a fairly recent addition. This is not the same as the Level Nine OOPS which takes you back one move. Infocom, like many other games from the USA, requires longer inputs, for example EXAMINE rather than the more usual Brit-

ish short form of EXAM. Therefore it is more likely that typing mistakes will occur – entering OOPS XXXXXX enables you to correct only the misspelt word. Clever stuff!

Sadly, Infocom games are never cheap, but on the other hand you always get good value for your money. The Amstrad games are run under CP/M so will run on both PCW and CPC machines (with disc drive). PC 1512 owners are catered for by the IBM versions.

Crashes galore

At long last the second part of the Lord of the Rings from Melbourne House is seeing the light of day. Part one sold like crazy, but had many serious faults, its very slow speed of response and the bugs that caused the program to crash being the most memorable. The Shadows of Mordor should sell well to all LOR fans, regardless of the faults of its predecessor. But what can we expect this time round? Have those Australian programmers learnt from their previous efforts?

Melbourne House, with an ever watchful eye on the promotion of its products, sent out pre-release versions for the magazines to review. These were essentially the finished article, though the final version will have some slight textual alterations to keep it more in line with Professor Tolkien's original style – perhaps this refers to the Wimpy Orc I met.

The Shadows of Mordor continues the story of Frodo's and Sam's travels from shortly after where part one ended. Should you succeed in your quest (be positive – could there be any doubt) you will finish this part after escaping from the lair of the giant spider, Shelob. Unlike part one, this is a single load game and does not have such a large number of locations. The



emphasis is more on problem solving and learning how to use the objects you have with you or find along the way.

The plot follows the second book of the trilogy – The Two Towers – fairly closely. There are only minor variations to give the game a series of problems for the player to solve. There are no graphics in the CPC version, which sadly is on cassette only. The location descriptions are long and picturesque, without the ghastly liberties taken in part one – remember the heavy metal orc band? There is even a PRINT facility, so that players with printers can study their moves at leisure from a hard copy.

As there are only two hobbits involved this time, there are no overlapping pages displayed on the screen to let you know who is your present character, and consequently no 30 second waiting period while they all sort themselves out.

Once loaded, the program asks which hobbit you want to play, Frodo or Sam. You may choose to play one or both – for both type in FRODO AND SAM, not BOTH. Although there are only about seven major puzzles to solve, and not that many objects to find, the game is unlikely to be finished at one sitting. Everything has a very logical answer and once you have spotted what is needed you only have to overcome wandering orcs and the comprehensive command interpreter.

The odd roving orcs are a real pain. Hobbits are not exactly the most warlike of creatures and cannot be expected to defend themselves too well when attacked. Consequently, confrontation is to be avoided. This is not a quest for a single hobbit. Six times, on arriving at one location, Sam died before my eyes. We had given no aggravation, merely walked past. Now this should not have annoyed me too much as I had sensibly saved the game position only a few steps back. Unfortunately saving a game to cassette takes four minutes, and loading it back in six times is the best part of half an hour.

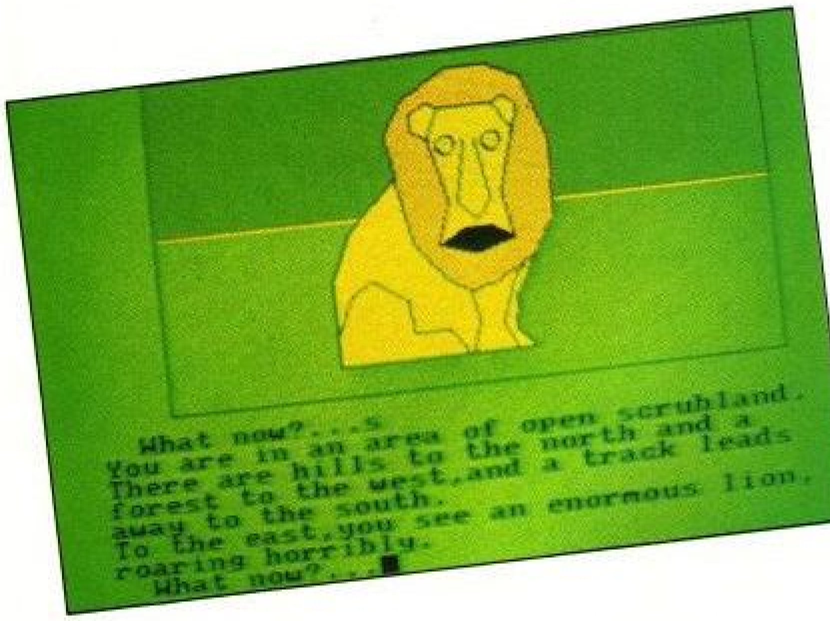
The orcs serve no real purpose in the game play, except of course to give a very real sense of atmosphere. Their appearance is random, so I was just repeating my actions until the one-in-whatever chance of them not appearing. Surely there could be better solutions, like wearing the elven cloaks, or hiding, or...

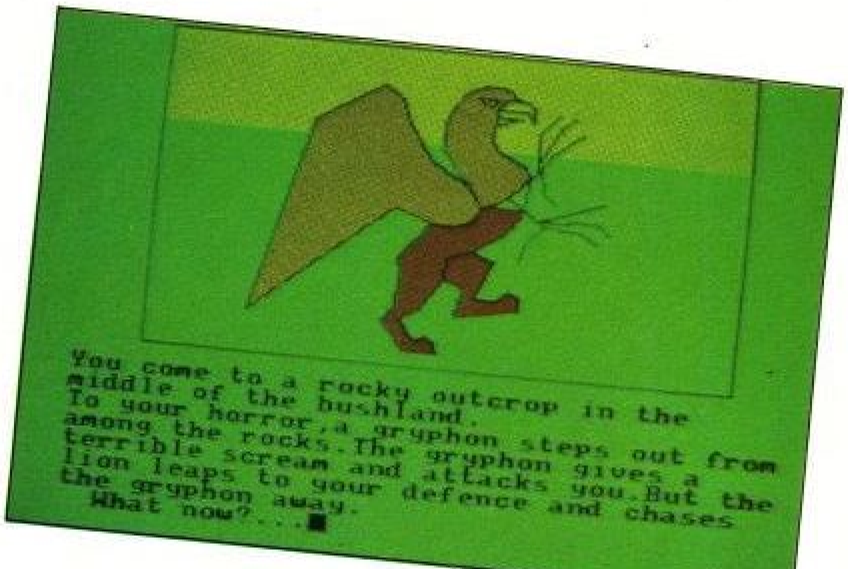
The long save time is presumably taken up with recording all the possible variations of the independent actions of characters within the game just as in Part One and The Hobbit. Surely one might question whether this complication is adding to or subtracting from the pleasure of the game. I really would like to know the number and type of possible independent actions that are occurring in the background. And, more importantly, whether these actions could not be achieved in another manner.

Because of this complex programming, you cannot QUIT and immediately restart the game: You must reload the main program first (about 12 minutes). There is also a discernible time lag between the location description being displayed on the screen and the appearance of the input command cursor. If you are a quick reader or are simply travelling over known ground you will often find you have typed in a word before there is a cursor. As there is no keyboard buffer operating, that word is lost and you will either have to repeat the command more carefully or delete what you have written and start again.

Commands may be strung together (up to 128 characters) and talking to other characters is easy and necessary. For all that the interpreter is quite comprehensive, it is still somewhat muddle headed on occasions. I mistyped WAIT as WIT and got the answer: "Sam attacks Sam with the beautiful small sword. Sam hits Sam". OUT gives: "Frodo doesn't see anything to lever over the cliff".

The game only crashed once, when I tried to climb





into a pit west of a lonely pine tree. Hopefully this is only possible in the review copy. Still, you have been warned!

The game design is not all that I would wish: It is slow and sometimes tries to be too clever, reading more into my words than was intended. Even so, it plays better than part one, is true to the atmosphere of the book and will be enjoyed by all patient lovers of Middle Earth. Just remember to eat often hobbits have a more active metabolism than you do, listen to what Smeagol has to say – and be wary of orcs and pits.

Value for money

What is a commercial program? Presumably one that is written and sold for gain. We expect a certain polish from the games we buy, together with a professionalism that should mean that it is free from bugs and is also good value for money. Sadly, this is not always the case, some notable adventures have bugs, others are not worth the money we pay for them. Most of the time we grin (or grimace) and put up with it. We still end up with another adventure to solve and even the worst usually have something in their favour.

I have just played a game that is excellent value for money, does not appear to have any bugs in it, is fun to play, has a reasonably logical plot, can barely be classed as commercial and will keep you guessing for hours.



Bestiary is written by Perry Williams, uses Incentive's Graphic Adventure Creator (for the CPC version) and costs £1.50. You will not find it in the shops as it is a home-produced effort and is only available by mail order.

You play a young prince. Your greatest love being to read the ancient bestaries where you have learnt much about strange and often legendary animals. All is well with the kingdom, until one year when a strange blight afflicts both the crops and the animals that the land desperately needs for its existence.

First your brother and later your sister leave the palace in search of a solution. Neither return. Both had been optimistically sent on their way with great celebrations by the king and his people. When you propose to follow in their footsteps, not even the king (your father) has any great hopes of your success and you leave quietly, unacclaimed and ill-equipped.

As you travel you will meet many creatures, some friendly, some not. You must find ways to get their help or at the very least something to distract their attention whilst you pass. The CPC graphics (by Rose Williams) are well up to any other GAC standards and the text is well written. A well produced, novel adventure. Buy it – you will certainly not regret it. Perry will even send you a hint sheet on receipt of a stamped addressed envelope. But be careful in reading the hints, they are a little too specific and may spoil your fun if read too soon.

Bestiary is available from: Perry Williams, 12 Goresdone Road, Cambridge CB5 8HR at £1.50. A PCW version can be obtained from Advantage, The Independent Computer User Group – telephone 0844 52075 for prices.

RATINGS

	Shadows of Mordor	Hollywood Hijinx	Bestiary
Plot	70	85	65
Atmosphere	70	80	65
Addiction	60	80	60
Difficulty	65	75	55
Overall	67	83	63

ACU

Going like clockwork

A device which can remember the time when your computer is turned off is really useful. Rupert Goodwins joins the Campaign for Real Time.

In the good old days, very few people knew about computers. Anyone who actually owned a micro could stun a cocktail party into awed silence by merely mentioning ram or hinting at address bus width. Now, thanks to Amstrad and Sinclair, it seems that if you haven't got a modem, disc drive and NLQ printer you aren't worth inviting to the mendicants' meths bash under the railway bridge.

Fear not. The upper hand can once more be gained, thanks to DK'Tronics' new add-on. Just drop the simple "Oh, haven't you got an RTC yet?" followed by "Real time clock, of course." into the conversation and win every time.

Real time clock is a bit of a strange concept. The jargon term Real Time covers a lot of nebulous ideas in the computer industry. Military types use it for machines that pretend to do things as if they were really happening, like flight simulators. Banks use real time to talk about electronic transactions that take effect within a few minutes, rather than being saved up until close of business. DK'Troniks Real Time Clock is a bit simpler than that: It's a clock that knows the real time – the hours and minutes stuff.

This might seem a little odd. Most clocks that humans use tend to work in minutes and hours, from sundials to the latest Yingtong 200m water resistant alarm chronograph with geiger counter. Computers have different needs, and thus different clocks. There is one master clock inside a CPC 464/664/6128 that whizzes along at 14 million ticks a second. It's used to time calculations and TV pictures, and the TIME variable that Basic users can see is generated by dividing it down to 300ths of a second ticks.

As it (like everything else in the computer) gets set to zero when switched on, there's no concept inside the computer of "real" time, like 21:53:37 on May 14th, 1987. It only knows that it's been 165231 lots of 300th second ticks since it was last turned on. Not terribly useful to the poor old user.

What would seem to be needed is a wristwatch for your Arnold. Like the Yingtong it would need a battery, to tide it over when the computer isn't turned on. It would need some way to set up the time, like the Yingtong's 14-function buttons. And it would be pretty useless without the wherewithall to read the carefully set-up and maintained GMT as it trickles away. The DK'Tronics Real Time Clock is that wristwatch.

The clock, looking more stylish than most peripherals in its angled black case, plugs into the expansion bus at the back of the CPC. It has a through connector for any other add-ons in your possession, which wins it points in profusion from this reviewer. There's a joystick-style connector on one side, and a small hole at the back in which can be seen glinting a small brass screw.

A peek inside reveals a rechargeable battery, five chips, a quartz crystal and a few odds and ends. The battery keeps the clock going for a few months between switch-ons, and recharges in a couple of minutes from the computer.

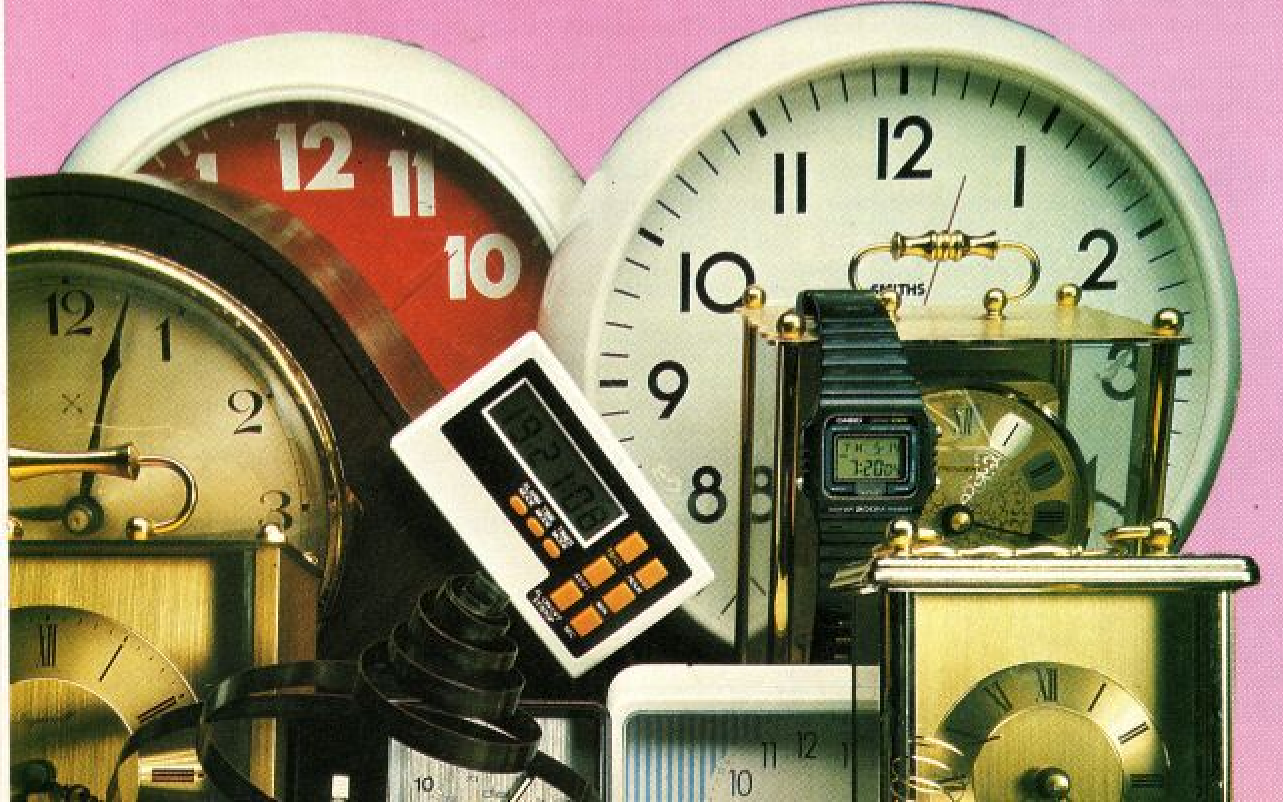
The brass screw allows a fine adjustment of the clock in case it gains or loses over a period of time. It isn't mentioned in the somewhat scanty manual, but the clock should be allowed to run for at least 24 hours between changes. The changes should be very small (about 10-20 degrees), and to be honest not many people will be upset enough by a second or two drift a month to want to bother.

The joystick style connector is a general purpose 8 bit input/output port. Hobbyists can use it to control robots, or read burglar alarm switches. With some programming to do with the clock parts, it could control tape recorders, radios and other timeable devices. Everyone else can ignore it, it won't bite.

Most of the hard clock-type work is done by one of the chips, the snappily-named HD146818. This has your actual clock inside, plus a bit of ram and a few extras such as an alarm circuit. It can also be found in Amstrad PCs and IBM AT computers, so you're in good company. The computer talks to it via the software supplied with the package. This comprises three programs; RSX.BAS which loads RSX.BIN, RSX.BIN which adds eight new extensions to Basic, and CLOCK-.COM, which allows CP/M+ (128k ram owners only) to use the RTC.

The extensions are all fairly obvious. BARASKTIME and BARSETTIME (nothing to do with when to feed hounds) read and set the time respectively. These all use year, month, day, hour, minute and second values in that order, so to set the RTC to the time mentioned earlier you'd type BARSETTIME 87,5,14,21,53,37.

You can omit as many of the parameters as you like, but you have to fill in all the settings after the one you want to set. So you can set just the seconds, or hours, minutes and seconds, but not just the hours or the year. All the computer knows is that the last setting in the list is seconds, and it works it all out from that.



BARASKTIME reads the time into a set of variables in the same order as BARSETTIME set it up in the first place.

Moving a little up the scale of horological sophistication we find the BARALARMON and BARALARMOFF commands. The first works by setting a Basic F% sets F% to -1 at 11:05:05, for example. It is also possible to make the alarm go off every hour – no prizes for guessing what BARALARMOFF does.

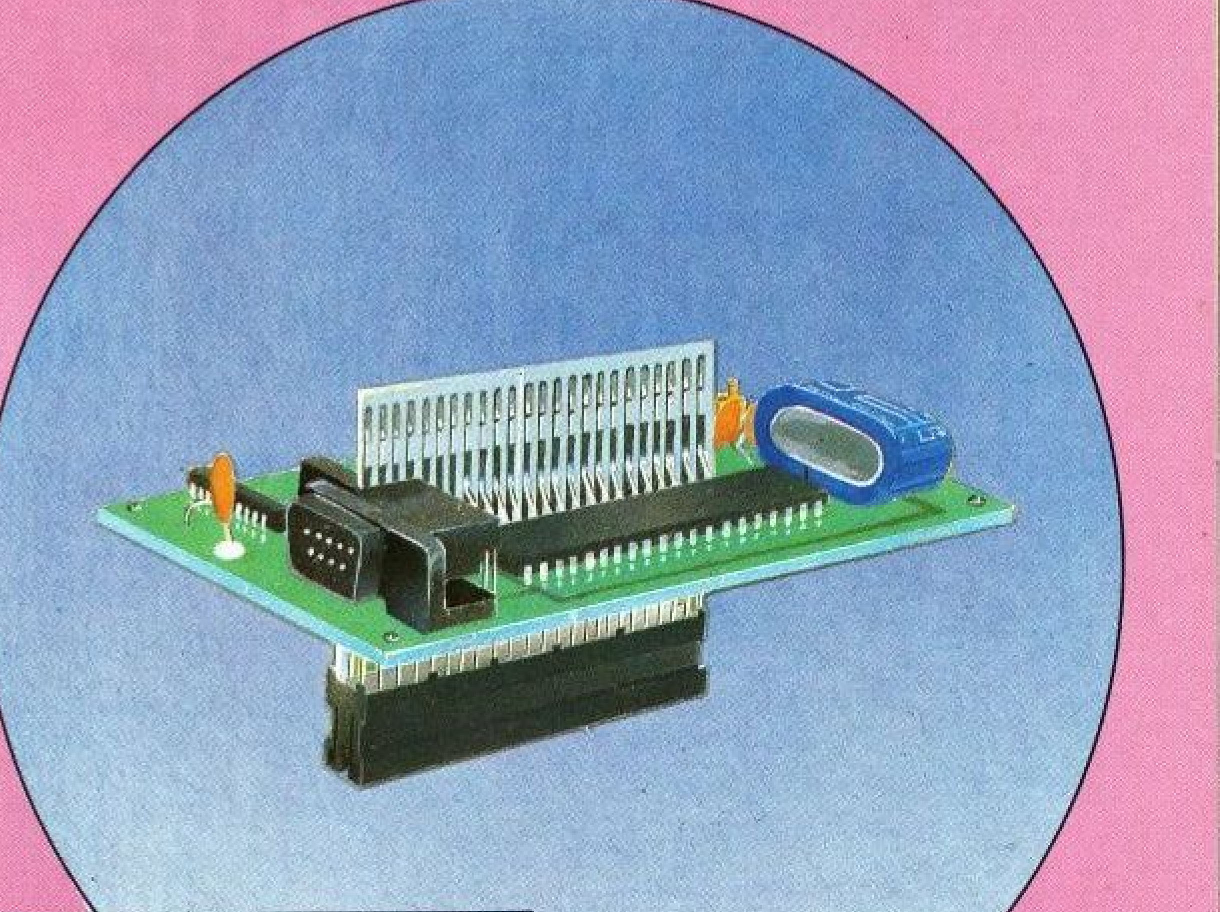
The final time-related commands are BARTIMEON and BARTIMEOFF. BARTIMEON,COLUMN,LINE,RATE displays the time at COLUMN,LINE on the screen, updating it every RATE/50th of a second. This only really works from Basic, as games tend to do very odd things with the screen. However, a few hours happy experimentation can be had finding out what happens with all those odd blobchasing programs. BARTIMEOFF stops the time display.

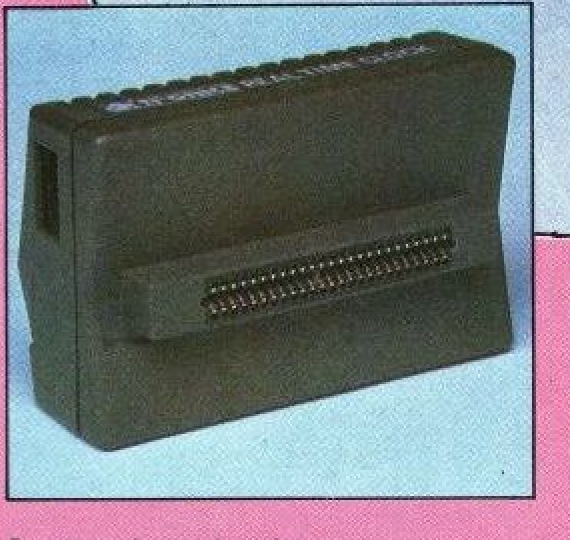
The last two commands are there for the hackers among us. A word of explanation first – the clock chip is designed to look to the computer as if it was memory. Only 64 bytes, it must be said, but the computer already has a full complement of memory, so DK'Tronics has had to use some powerful magic to shoehorn in even 64 bytes. This means that PEEK and POKE won't do any good, so the commands BARPOKERTC and BARPEEKRTC allow the more crazed user to access all 64 bytes.

These bytes are often used to store colour settings and other customisations for your software. As the contents stay even when the clock is unplugged from the computer, a possible use would be to hold a password without which the computer won't start up. That way, you could keep sordid details of your private life on disc, secure in the knowledge that with the clock hidden away nobody else could find out the awful truth by tampering. But it would take a bit of programming.

CLOCK.COM is run from CP/M. It sets the CP/M system clock to the real time clock's time, and allows the computer to mark anything saved to disc with the date and time – a procedure known as datestamping. Here lies the true usefulness of the product, because there are serious uses for this gizmo. Because by now the obvious question might be making itself felt – what can a £35 computerised clock do that a £1:99 wristwatch can't?

It depends on what you do with your computer. If it's just gamesplaying, then the RTC is not for you. However, serious users might just find it an investment worth having. If the computer is used for developing software under CP/M, say in C or assembler, then there are going to be various versions of the program being worked on floating about the place.





Most software developers try out a modification or bug fix by making a new version of the program, and keeping an old version just in case the modification proves worse than useless. This perfectly sound procedure spawns discs full of apparently identical software, and without datestamping it can be difficult to know which version of INVADERS.COM had that really meaty laser-zap.

With datestamping, it becomes easier to search for the version of two days ago, and just the sight of a program stamped 03:49 can bring tears to the glazed eyes of many a hacker. The same is entirely true of madmen who insist on writing reviews at (glances at wristwatch) half past twelve at night.

Other software can be improved by an RTC; mail merge programs can often be set up to insert the current date in a document, but this is a chore to begin with, and dire indeed after the twentieth reset of the evening. It can also be handy with accounts programs to know when a certain data file was last modified: Datestamping tells you.

On test, the clock worked. What else can one say? All the nasty business about leap years and funny months is taken care of, and times can be in 12 or 24 hour format. I couldn't find anything really wrong with the hardware design; the battery charging circuit was perhaps a little too simple. Similar designs (as Acorn knows) have catastrophically failed in the past – it only takes one faulty component to destroy the battery by overcharging and only one extra tuppenny diode to make it much safer. But it's unlikely to go wrong anyway; just a thought for next time, dk.

This is a serious peripheral for the serious user and hobbyist, who will find it seriously useful. The manual describes the technical bits of the interface and gives a couple of very minor application programs. It doesn't attempt to give any sort of idea as to the uses of the clock, or details of the chippery involved. But there's enough for the knowledgable to use it for real-time control of assorted hardware, or clever homebrew diary/appointment book software.

Some people might think that they won't rush out and buy it – instead they'll wait and get it for their birthday. After all, there's no present like the time.

DK'Tronics Clock: £34.95
For details call them on 0493 602926

ACU

Get your name in lights



Now *you* know how good a games player you are, but does anyone else? Peter Green shows how to add a high-score table to your games programs.

As the editor, the typesetter and especially myself are all still shell-shocked from last month's marathon bit of software, here's a simple routine so we can all unwind. It's a self-contained subroutine for inclusion in a arcade-type games program that is meant to be called whenever a game is over (for example, run out of lives or time).

Hiscore checks to see whether the score achieved by the player is higher than the lowest of a set of 10 high scores. If it is, the player is prompted to enter his name at the keyboard, then the score is inserted into the hiscore table at the correct place and the new table printed on-screen. The routine then waits for any key to be pressed before returning to the calling program, which presumably will loop round for another game.

As usual, the assembly listing is copiously commented and the article will cover the major principles. Assemblers other than MAXAM may need the labels to be limited to six letters, and WORD, TEXT and RMEM replaced by DEFW, DEFM and DEFS respectively.

The table is laid out as in shown in Figure I: A list of 10 strings of 16 characters. For this example program I'm assuming the score is a six-digit number, allowing for scores of 0 to 999999.

If you need a different range, you'll need to alter the string sizes and several of the program's loop counters to suit. Each string entry starts with the score value in Ascii, a space, then the corresponding name (maximum of eight characters, padded to eight with spaces). Again, you can alter the size of the name if necessary. The sixteenth character in each string is a carriage return (Ascii 13).

Immediately after the hiscore table is an eleventh string with the same layout, labelled buffer in the listing. On entry to hiscore, the current score is copied from its variable into the first six locations of the buffer. This is not straightforward as I'm assuming that your game, like commercial ones, stores the score in packed BCD (binary coded decimal) rather than hexadecimal – after all, players usually want their scores in base 10, not base 16.

Packed BCD stores two decimal digits in the two nibbles of a binary byte, so that 64 (two decimal digits) is stored as &64 (one hexadecimal byte). The move–score routine takes each of the three BCD bytes, splits it into two single numbers (0-9) and adds &30 (48 decimal) to give the correct numerical Ascii codes (48-57). The rest of the buffer, up to the carriage return, is filled with spaces.

Now that the score is in the same form as those in the rest of the table, the program compares it with the last (lowest) entry in the table. This is done by subtracting the buffer score from the low score one digit at a time, main-

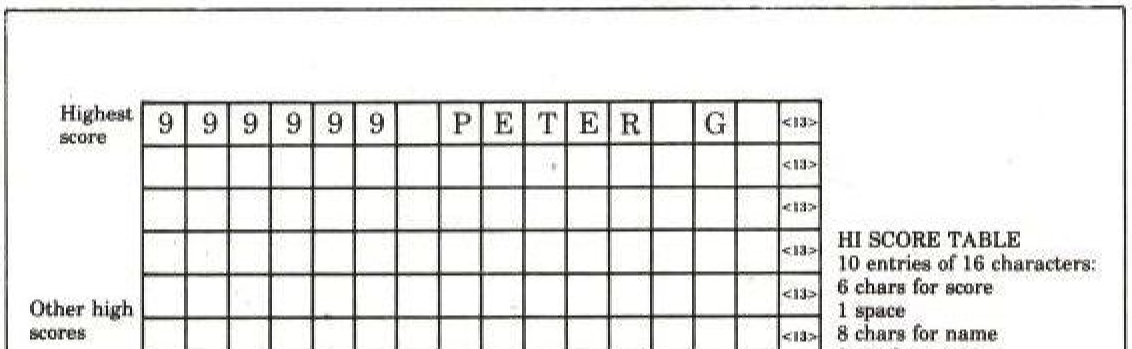


Figure I

A Right Royal Joystick

Cheetah MACH I +
MICROSWITCH JOYSTICK



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- AUTO FIRE
- +2 SELECTOR CONNECTOR
- 12 MONTH WARRANTY

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● Heavy duty base with strong stabilizing suction cups.
● Highly sensitive light touch **MICRO SWITCH** fire buttons.
● Ergonomically designed control handle with indestructable **METAL SHAFT**. ● Built in **AUTO FIRE** function.

MachI+Joystick compatible with: ● Sinclair ZX Spectrum 16K, 48K, 128K, +2
● Amstrad computers ● Commodore 64 & VIC 20 Computers
● Commodore C16 & Plus 4 Computers (adaptor sold separately)
● Atari 2600 & Atari 5200 Video Game Systems ● Atari Home Computers

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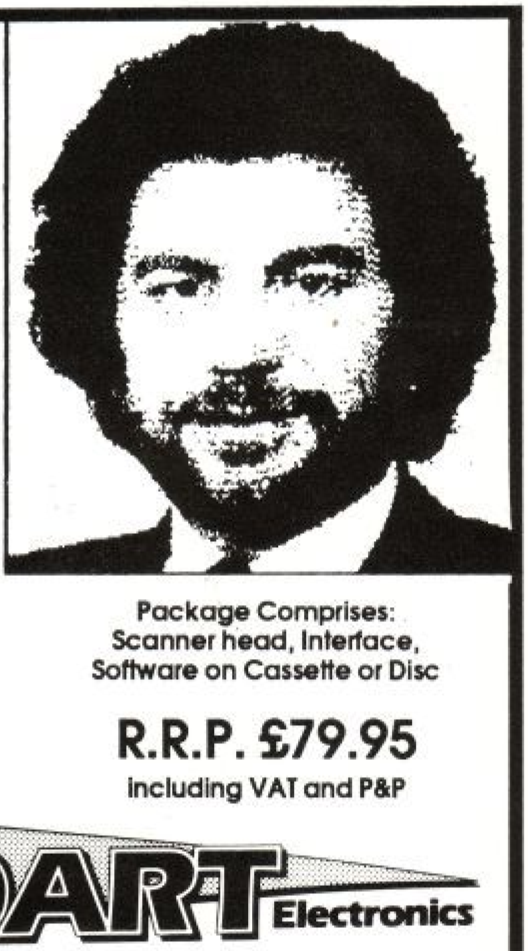
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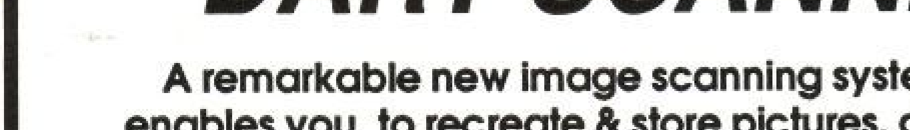


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taining the "borrow" bit in the carry flag between bytes. If the carry is set after all six subtractions, the new score was higher than the lowest score and needs to be inserted into the table; otherwise the new score hasn't made the grade and the routine just quits.

The next thing to do is ask for the joystick genius's name and get the response from the keyboard, after flushing out the keyboard buffer in case there are any keypresses left stored there after the game finished.

The input routine is very simple – only capital letters and spaces are accepted. The only editing is with the delete key, and pressing ENTER terminates entry. The get–key routine rejects any keypresses that don't match the valid ones above, and also prevents the player from adding more than eight letters to the buffer, or trying to delete characters when the buffer is empty.

Note that the delete key returns a value of 127 from the keyboard, but that printing character 127 doesn't result in deletion, it prints a checkerboard symbol.

In fact the Amstrad Ascii set has no single control character for backspace-and-delete: We need to backspace (Ascii 8) and delete-character-under-the-cursor (Ascii 16). (Some time after it's launch the Amstrad's designer, Roland Perry, said he'd like a pound for every Amstrad high score table he'd seen with chessboards in it.)

The operation we want to perform now is to remove the lowest score from the table, find the position that the new score should occupy, move the scores underneath down by one string position, and add the new score in the gap. This is a messy thing to program and we have a more elegant solution available.

Because of the way the hiscore table and the buffer are laid out in the computer's memory, we can think of them now as a single table of 11 strings. If we do a sort on these, the new addition will automatically find its way to the correct position and the lowest score will drop into the buffer.

Only the 10 strings in the table are ever printed and the buffer will be overwritten anyway the next time hiscore is called, so effectively the sort throws away the redundant entry. Neat, eh? especially as we have a sort subroutine already written (back in Part 2 of the series).

There's just one alteration to make to that sort program. Before, we sorted strings in ascending order, so the biggest went to the end of the list. We want a descending sort, so that the highest score rises to the top of the table.

There are two changes to make. Find label .sort6 and delete the SCF instruction immediately before it. Then change the third instruction after the label .sort6 from JR C,sort7 to JR NC,sort7. Now the subroutine only swaps string pairs if the second is greater than the first, so the sorted list is reversed. You may remember that the sort printed dots while it was thinking, I've removed this.

The final little trick that the hiscore routine uses is in printing out the strings. Each one needs to be terminated with Ascii 13, because the sort routine uses that as an end of string marker.

Some computers (like the Spectrum) treat Ascii 13 as both a carriage return and line feed, placing the cursor at the start of the next screen line. The Amstrad doesn't you need to print both a CR and a line feed (ASCII 10) to do that. We could have included the line-feeds in the table strings, but instead I've set up a text window in the screen centre which is 15 characters wide.

As each string is printed, the sixteenth character (CR) is forced on to the start of the next line. Printing the CR leaves the cursor where it is, ready for the next string. The byte after the tenth string has to made zero before printing the table, so that our faithful old print routine knows when to stop.

You don't have to be sneaky to be a programmer, but it helps.

```
Table of Amstrad firmware calls
.km_wait_char      EQU &BB06
.km_read_char      EQU &BB09
.txt_output        EQU &BB5A
.txt_win_enable    EQU &BB66
.txt_set_cursor    EQU &BB75
.txt_cur_on        EQU &BB81
.txt_cur_off       EQU &BB84
.scr_set_mode      EQU &BC0E

Table of Ascii characters
.backspace         EQU 8
.cr                EQU 13
.clear_char        EQU 16
.space             EQU 32
.delete            EQU 127

.name_size         EQU 8     maximum number of letters for input.
.hiscore                     Entry point for hiscore routine
LD HL,buffer                 Point to buffer area for new table entry.
LD DE,score                  Point to the score to be entered.
LD B,3                       In this example, score is 6 BCD digits.

.move_score
LD A,(DE)                    Get first packed BCD digit pair.
RRCA
RRCA
RRCA
RRCA                         Swap high and low nibbles.
AND &F                       Isolate bottom nibble (which was the
                             "first").
ADD A,&30                    Include the Ascii code bits for "0".
LD (HL),A                    Store the Ascii code in buffer.
INC HL                       Point to next buffer address.
LD A,(DE)                    Fetch byte again.
AND &F                       This time keep the second nibble.
ADD A,&30                    Again, turn the number into an Ascii code.
LD (HL),A                    Store code INC HL.
Point to next address.
INC DE                       Point to next pair of digits in score.
DJNZ move_score              Loop until done all three pairs of digits.
LD B,9                       So 6 chars entered into buffer, leaving 9.

.clear_buffer
LD (HL),space                So loop nine times, filling up the rest of the
                             buffer
INC HL                       with the space character (Ascii 32), thus
                             clearing out
DJNZ clear_buffer            previous name.
LD HL,buffer+5               HL points to last digit of latest player's
                             score.
LD DE,table+144+5            DE points to last digit of lowest score in
                             table.
LD B,6                       Six numbers in score.
OR A                         Clear the carry.

.compare
LD A,(DE)                    Get "lowest score" digit.
SBC A,(HL)                   Subtract "new score" digit.
DEC HL DEC DE                Decrement pointers.
DJNZ compare                 Loop for all digits.
RET NC                       If new score isn't higher than lowest score
                             on table then exit back to calling routine.
LD A,1                       Else need to get player's name and add
                             entry to table.
CALL scr_set_mode            Set Mode 1.
LD H,1
LD L,10
CALL txt_set_cursor          Move cursor to approximate middle of
                             screen.
LD HL,prompt
CALL print                   Tell player to enter his name.
CALL txt_cur_on              Turn on text cursor so player can see where
                             he/she is.

.flush
CALL km_read_char            Clear keyboard buffer by throwing away
                             any chars.
```

```
JR C,flush              until routine reports "none left".
LD HL,buffer+7          Point to address in buffer where name is to
                        be stored.
LD B,0                  Zero character count which is stored in B.

.get_key
CALL KM_WAIT_CHAR       Wait for player to press a key.
CP cr                   Is it "ENTER"?
JR Z,sort_table         If so, entry is finished so go and sort the
                        table.
CP delete               Is it "DELETE"?
JR Z,do_delete          If so, go delete last character.
CP space                Is it space?
JR Z,char_OK            If so, can print it.
AND &DF                 Else force whatever's left to upper case.
CP "A"                  Is result less than A in Ascii set?
JR C,get_key            If so, ignore it.
CP "Z"+1                Is result higher than Z in Ascii set?
JR NC,get_key           If so, ignore it.

.char_OK
LD C,A                  Ok, have a space or a capital letter. Save it
                        in C.
LD A,B                  Get count of number of characters stored in
                        buffer.
CP name_size            Has player typed in maximum yet?
JR Z,get_key            If yes, ignore and loop for more input (delete
                        or cr).
LD A,C                  Else get character back into A.
LD (HL),A               Store it in the buffer.
CALL txt_output         Print it on the screen.
INC HL                  Point to next address in buffer.
INC B                   Add 1 to number of characters stored.
JR get_key              Loop back for more input.

.do_delete
INC B                   First want to see if there's anything in
                        buffer.
DEC B                   Doing INC/DEC leaves B unchanged, but
                        sets the Z flag
JR Z,get_key            if B was zero, in which case ignore delete &
                        loop back.
DEC HL                  Else step back pointer to the previous cha-
                        racter
DEC B                   and subtract 1 from number of characters
                        stored.
LD (HL),space           Replace deleted character in buffer with a
                        space.
LD A,backspace          Print a backspace to move screen cursor
                        back
CALL txt_output         on to unwanted character.
LD A,clear_char         Then print the "CLR" control character
                        which erases the
CALL txt_output         character under the cursor.
JR get_key              Loop back for more input.

.sort_table
CALL txt_cur_off        Switch off the cursor.
LD HL,11                No. of entries in table.
LD DE,table             Address of first entry.
CALL sort               Sort the hiscore table into descending order.
LD A,1
CALL scr_set_mode       Clear screen to Mode 1 again.
LD HL,heading
CALL print              Print the table heading.
LD H,12
LD D,26
LD L,8
LD E,24
CALL txt_win_enable     Set up text window left 12, right 26, top 8,
                        bottom 24.
XOR A                   overwrite a zero immediately after hiscore
                        table so
LD (buffer),A           that the PRINT routine terminates
                        correctly.
LD HL,table             Point to start of hiscore table.
CALL print              Print the table.
JP km_wait_char         Then wait for any keypress and exit to call-
                        ing routine.

.print
LD A,(HL)               Isn't this a useful little routine?
INC HL
OR A
RET Z
CALL txt_output
JR print

.prompt
TEXT "Please enter your name (8 letters max): ",0

.heading
TEXT "                  HIGH SCORE TABLE",0

.table
TEXT "999999 PETER G ",     13
TEXT "863411 SIMON ",       13
TEXT "738475 JANE ",        13
TEXT "234434 LORRAINE",     13
TEXT "118763 HAIRY ",       13
TEXT "063984 HACKER ",      13
TEXT "042179 ZZKJ ",        13
TEXT "037660 CLIFF ",       13
TEXT "000587 BILL ",        13
TEXT "000001 LANCE ",       13

.buffer
TEXT " ",                   13

.score
BYTE &15,&60,&33        packed BCD representation of sample
                        score, 156033.

.sort                   enter with HL=number of strings in list,
                        DE=list start
LD A,H                  LET A = H
OR L                    LET A = A OR L
RET Z                   IF number of strings = 0 THEN
                        RETURN.
LD (list_length),HL     ELSE initialize list length counter to
                        number of strings.

.sort1
LD HL,(list_length)     LET HL = list_length
DEC HL                  LET HL = HL-1
LD (list_counter),HL    LET list_counter = HL (initialise string
                        counter)
LD A,H                  LET A = H
OR L                    LET A = A OR L
RET Z                   IF list_length = 0 THEN RETURN
                        (because list has only one string).
PUSH DE                 ELSE save list start.
EX DE,HL                LET HL = DE, LET DE = HL (making
                        HL = start of list, a fake 'second string'
                        to allow sort2 to work correctly)
LD B,0                  zero the pass exchange flag

.sort2                  here HL=pointer to second string of pair
LD D,H
LD E,L                  LET DE=HL (pointer to new first string
                        in pair)

.sort3                  Move second-string pointer to next
                        string in dictionary.
LD A,13                 LET A = 13 (marker byte test value,
                        carriage return)
LD C,0                  LET C = 0 (zero the current exchange
                        flag)

.sort4
CP (HL)                 Compare string character to A, which is
                        13.
INC HL                  Point to next character in string.
JR NZ,sort4             IF character <> 13 THEN GOTO sort4.
PUSH DE                 ELSE save new first-string pointer.
PUSH HL                 Save new second-string pointer.

.sort5
LD A,(DE)               LET A = character from first string
CP (HL)                 compare with character from second
                        string
JR NZ,sort6             IF A <> character THEN GOTO sort6
                        (with carry set if second>first)
INC DE                  ELSE LET DE = DE+1
INC HL                  LET HL = HL+1 (point to next cha-
                        racter in each string)
CP 13                   have we reached the end-marker of the
                        first string?
JR NZ,sort5             IF character <> end-marker (13) THEN
                        GOTO sort5
```

```
.sort6
POP HL                  LET HL = old second-string pointer
POP DE                  LET DE = old first-string pointer
JR NC,sort7             IF carry = 0 THEN GOTO sort7
                        (second<=first, so no exchange needed)
EX DE,HL                ELSE LET HL = first-string pointer
LD DE,temp              LET DE = pointer to safe temporary
                        storage area
PUSH DE                 save swap area pointer
PUSH HL                 save first-string pointer
CALL move_string        move first string into temp, including
                        end-marker
POP DE                  LET DE = pointer to first string (here
                        HL = start of second string)
CALL move_string        move second-string to first-string pos-
                        ition
POP HL                  LET HL = pointer to swap area (here DE
                        = new second-string position)
PUSH DE                 save new second-string position
CALL move_string        move string at swap area to new second-
                        string position
POP DE                  LET DE = new second-string position
LD H,D
LD L,E                  LET HL = new second-string position
                        too
LD BC,&FFFF             LET B = &FF (an exchange was made)
                        LET C = &FF (current exchange flag)

.sort7
PUSH HL                 save new second-string pointer
LD HL,(list_counter)    LET HL = string count
DEC HL                  LET HL = HL-1
LD (list_counter),HL    LET list_counter = HL
LD A,H
OR L                    test if string count is 0?
POP HL                  LET HL = second-string pointer
JR Z,sort8              IF list_counter = 0 THEN GOTO sort8
                        (reached end of list)
LD A,C                  ELSE LET A = C (current exchange
                        flag)
OR A
JR NZ,sort3             IF A = 0 THEN GOTO sort3 (an
                        exchange occurred so the first-string
                        pointer is OK
JR sort2                ELSE GOTO sort2 (make first-string
                        pointer = second-string pointer)

.sort8
POP DE                  LET DE = list_start
LD A,B                  LET A = B (the pass exchange flag)
OR A
JR NZ,sort1             IF A <> 0 THEN GOTO sort1 (list not
                        sorted yet)
RET                     ELSE RETURN (no exchanges were
                        made so list is sorted)

.move_string
LD A,(HL)               LET A = character from source string
LD (DE),A               LET destination = A
INC HL                  LET HL = HL+1
INC DE                  LET DE = DE+1
CP 13                   test for end_of_string marker
JR NZ,move_string       IF A <> 13 THEN GOTO move_string
RET                     ELSE RETURN because the string has
                        been moved

.temp                   RMEM 30
.list_counter           WORD 0
.list_length            WORD 0
```

ASSEMBLY POINT PART 9

ACU



Operation clean-up

Mrs Mop meets the program listing – a program for the CPC in Basic and machine code by Paul S. Jenkins.

Let us suppose that you have been given a Basic program and think it might be interesting or instructive to list it to your printer. It looks fine on the screen, apart from one or two strange characters, so you switch on the trusty Epson compatible printer and type LIST#8. Then you nip off to make a cup of tea while you wait for the completed listing.

But something's wrong, what are those gaps in the printout? Why is some of the listing printed in condensed typeface and some in double width, and where did all those blank lines come from?

The reason for the twisted listing is a problem known as embedded control characters. To save time and memory some programmers use these codes for screen formatting, PEN, PAPER and INK changes.

Here is a simple example of how it's done. Type PRINT" on your Amstrad, and before pressing the Enter key hold down the letter X, then press Enter. If you have done this correctly you should find that the pen and paper inks have been swapped.

What you have just typed is the equivalent of PRINT CHR$(24), and if you look in the User Instructions for your CPC you will find a list of Basic control characters to enable many different effects to be obtained using the PRINT CHR$() command. All these characters can be entered directly into print statements using the control key.

Try typing PRINT" and then Control G. If the volume control is turned up you should hear a beep from the internal speaker. A Basic program which includes embedded control characters will work as expected, but when it is listed on the screen the computer will translate the characters into those strange symbols.

Worse, when you attempt to list the program on paper, the printer interprets the symbols as printer control codes and changes its typeface, prints a form feed, turns on underlining, or one of a number of unwanted features.

All the foregoing is a very strong argument against using embedded control characters in your programs. It is certainly something which will cause your listing to be rejected by *ACU*'s Liz Ting. A problem which cannot be solved by good practice involves the use of the PRINT USING command. Refer again to the user instructions and you will see that to print formatted numbers with a preceding pound sign the PRINT USING template must consist of a combination of hash and pound signs. This will print correctly on the screen, but not on an Epson compatible printer.

Depending on whether your printer has the English or American character set in operation, the print using template will appear as all pound signs or all hashes. It is impossible to tell which is which if what you see is:

```
PRINT_to-
tal_½_;USING_########,.##_;t
```

An Epson compatible printer can be switched between American and English character sets by means of the aforementioned printer control codes. The Basic program listed here provides a way of switching between character sets during printing.

The program will also filter out all embedded control characters and convert them into a pair of square brackets enclosing an up-arrow (^) and a key character. This means that the two examples given above would appear as [^X] (Control – x), and [^G] (Control – G).

Any graphics characters or other codes whose Ascii value is more than 127 will also be converted, to square brackets enclosing a g– and the Ascii value of the character which might otherwise cause the printer to go haywire.

The only restriction on the use of the Filter utility is that the program to be listed must be in Ascii format. If the name of your program is YOURPROG, then before using Filter type: LOAD"YOURPROG" and then SAVE "YOURPROG",A. This will create a version of your program in Ascii format. Then you can run Filter.

You will be asked for the name of your program and whether you want the listing sent to the screen, the pri-

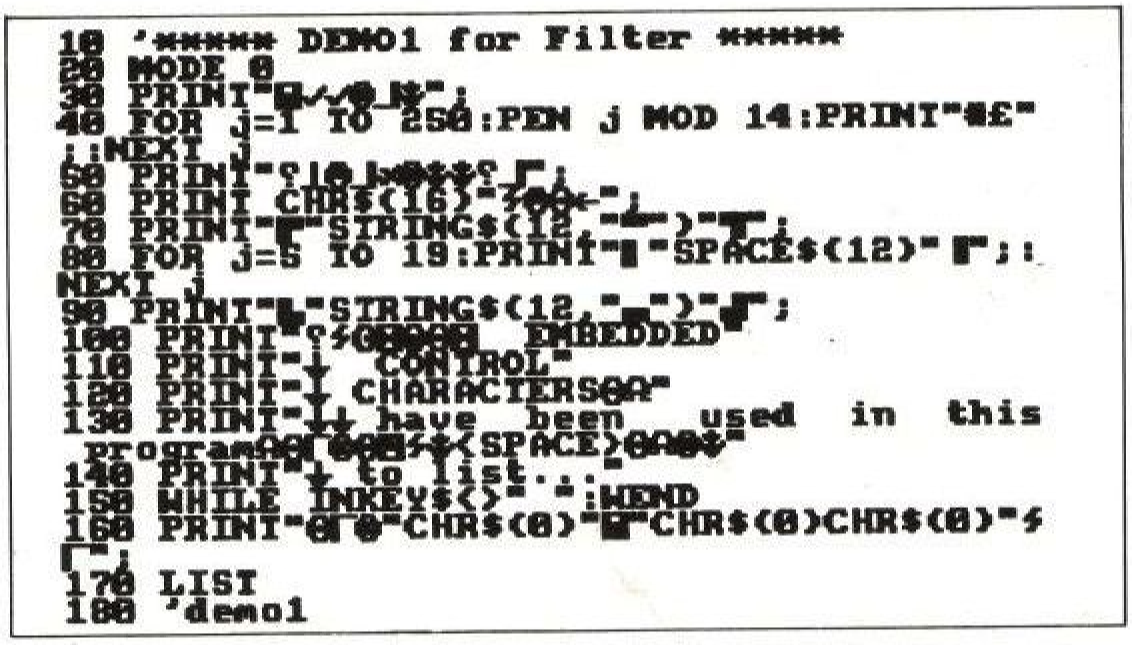
nter, cassette or disc. If you select either of the last two you will be asked for the name of your program and whether you want to give the filtered listing. If you select the disc when no disc drive is present you will be asked again.

The program is quite simple in operation, and meaningful variable names have been used so that it can be adapted as necessary for a non-Epson standard printer. Error trapping is included for all disc and tape operations, so although the program was written on a CPC6128 it should work on a 664 and 464 with or without disc drive.

The screen dump of DEMO1 in Figure I shows how a program contains embedded control characters, a pound sign, a hash sign, and graphics characters appear on the screen. Don't list this program directly to your printer unless you want to waste a lot of paper.

If you want to enter DEMO1 into your CPC so that you can test the Filter program then refer to the Filtered listing of Demo 1, which was produced using the Filter program.

Whenever control codes appear in the filtered listing you should hold down the Control key and press the character shown after the up arrow (don't type in the square brackets).



To type in the graphics characters you first need to re-define some keys. For instance, to re-define the 7 key as the character whose code is 135 type KEY 128+7,CHR$(135) and press Enter. Now when you press 7 an inverted L shape will be printed.

When you have typed in the complete DEMO1 listing it should look like the screen dump shown in Figure I. When run, DEMO1 produces a simple demonstration title screen in Mode 0 and waits for you to press the spacebar.

Save the program by typing SAVE"DEMO1",A and press Enter. The A will cause the program to be saved in Ascii. Filter will only work with programs saved in this way. If you try to use Filter with a normally saved program it will not accept the file name and will ask for another.

It is a good idea to save the program in normal format as well as the Ascii; it will load faster and a control Z in the Ascii listing will stop it from loading.

It is best to avoid using embedded control characters, but at least Filter makes your programs readable.

```
10 ' ******************************
20 ' *                            *
30 ' *           FILTER           *
40 ' *       Paul S Jenkins       *
50 ' *            1986            *
60 ' *                            *
70 ' *  Amstrad CPC464/664/6128   *
80 ' *                            *
90 ' ******************************
100 '
110 'initialise
120 '
130 'soft EOF m/c [↑Z] (ACU April 85)
140 '
150 top=HIMEM
160 MEMORY &A3FF
170 sum=0
180 FOR ad=&A400 TO &A425
190    READ byte$
200    value=VAL("&"+byte$)
210    POKE ad,value
220    sum=sum+value
230 NEXT ad
240 READ checksum
250 IF sum<>checksum THEN 1830
260 FOR ad=0 TO 2
270    POKE &A426+ad,PEEK(&BC80+ad)
280 NEXT ad
290 POKE &BC80,&C3:POKE &BC81,0:POKE &BC
   82,&A4
300 '
310 'heading
320 '
330 star$=STRING$(19,42)
340 PRINT:PRINT star$
350 PRINT"* FILTER PSJ 1986 *"
360 PRINT star$:PRINT
370 '
380 'printer & screen control codes
390 '
400 esc$=CHR$(27)
410 lang$=esc$+"R"
420 english$=lang$+CHR$(3)
430 american$=lang$+CHR$(0)
440 pound$=english$+CHR$(35)+american$
450 bel$=CHR$(7)
460 inv$=CHR$(24)
470 '
480 'string functions
490 '
500 DEF FN control$(a$)="[↑"+CHR$(ASC(a$
   )+64)+"]
510 DEF FN char$(a$)=RIGHT$(STR$(ASC(a$)
   ),LEN(STR$(ASC(a$)))-1)
520 '
530 'select file
540 '
550 PRINT
560 INPUT"Filename to be listed";file$
570 IF file$="THEN 560
580 file$=UPPER$(file$)
590 PRINT:PRINT"Searching for "file$
600 ON ERROR GOTO 1760
610 OPENIN file$
620 ON ERROR GOTO 0
630 '
640 'select output stream
650 '
660 PRINT
670 PRINT"Screen, Printer, ";"Cassette o
   r Disc (S/P/C/D)";:INPUT choice$
680 choice=INSTR(" SPCD",UPPER$(LEFT$(ch
   oice$,1)))
690 IF choice THEN ON choice GOSUB 670,1
   130,1430,1180,1240 ELSE 670
700 '
710 'output title
720 '
730 PRINT
740 PRINT!stream,"Filtered listing of "f
   ile$
750 PRINT!stream,STRING$(20+LEN(file$),"
   -")
760 PRINT!stream:PRINT!stream,"Control c
   odes are shown within square ";
770 PRINT!stream,"brackets, e.g. [↑A], a
   nd graphics
780 PRINT!stream,"characters are shown b
   y [g-code].
790 PRINT!stream
800 '
810 'main loop
820 '
830 WHILE NOT EOF
840    LINE INPUT!9,a$
850    FOR j=1 TO LEN(a$)
860       i$=MID$(a$,j,1)
870       z=ASC(i$)
880       IF z=163 AND stream=8 THEN PRINT
   !8,pound$;:GOTO 930
890       IF z=163 THEN PRINT!stream,i$;:G
   OTO 930
900       IF z<32 THEN PRINT!stream,FN con
   trol$(i$);:GOTO 930
910       IF z>127 THEN PRINT!stream,"[g-"
   FN char$(i$)"]";:GOTO 930
920       PRINT!stream,i$;
930    NEXT j
940    PRINT!stream
950 WEND
```

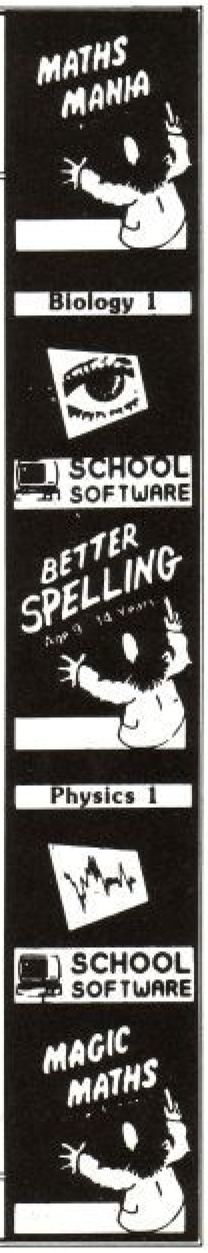
```
960 CLOSEIN
970 PRINT!stream:PRINT!stream,"End of "f
    ile$
980 PRINT!stream
990 CLOSEOUT
1000 ON ERROR GOTO 1670
1010 |DISC
1020 ON ERROR GOTO 0
1030 FOR ad=0 TO 2
1040   POKE &BC80+ad,PEEK(&A426+ad)
1050 NEXT ad
1060 MEMORY top
1070 '
1080 'end of program
1090 '
1100 PRINT bel$"Finished!
1110 END
1120 '
1130 'list to screen
1140 '
1150 stream=0
1160 RETURN
1170 '
1180 'list to cassette
1190 '
1200 ON ERROR GOTO 1670
1210 |TAPE
1220 GOTO 1280
1230 '
1240 'list to disc
1250 '
1260 ON ERROR GOTO 1710
1270 |DISC
1280 ON ERROR GOTO 0
```

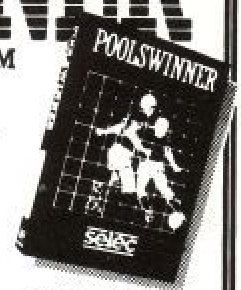
```
1290 stream=9
1300 PRINT
1310 INPUT"Filename for output of listin
    g";outfile$
1320 IF outfile$=""THEN 1310
1330 dot=INSTR(outfile$,"."):IF dot>1 TH
    EN outfile$=LEFT$(outfile$,dot-1)
1340 outfile$=outfile$+".FTR"
1350 ON ERROR GOTO 1760
1360 OPENOUT outfile$
1370 ON ERROR GOTO 0
1380 PRINT:PRINT"Printing "UPPER$(outfil
    e$)" to ";
1390 IF choice=5 THEN PRINT"disc";ELSE P
    RINT"tape";
```

```
1400 PRINT"...
1410 RETURN
1420 '
1430 'list to printer
1440 '
1450 WHILE INP(&F500) AND 64
1460   PRINT bel$ inv$"PRINTER NOT ON LI
NE!"inv$
1470   PRINT"Prepare printer and ";"pres
s SPACE to continue
1480   WHILE INKEY$<>" ":WEND
1490 WEND
1500 WIDTH 255
1510 stream=8
1520 PRINT!8,american$:PRINT:PRINT"Pleas
e wait while printing...
1530 RETURN
1540 '
```

```
1550 'data for m/c
1560 '
1570 DATA E5,2A,26,A4,22,80,BC,3A
1580 DATA 28,A4,32,82,BC,CD,80,BC
1590 DATA 21,00,A4,22,81,BC,21,80
1600 DATA BC,36,C3,E1,D8,C8,FE,1A
1610 DATA 37,3F,C0,B7,37,C9,4790
1620 '
1630 'error handlers:
1640 '
1650 'ignore if no disc
1660 '
1670 RESUME NEXT
1680 '
1690 'retry if no disc
1700 '
1710 PRINT bel$"DISC NOT AVAILABLE
1720 RESUME 670
1730 '
1740 'filing error
1750 '
1760 PRINT:PRINT bel$"FILENAME ERROR - T
    RY AGAIN
1770 IF ERL=610 THEN CLOSEIN:RESUME 560
1780 IF ERL=1360 THEN CLOSEOUT:RESUME 13
    10
1790 PRINT"Error"ERR"in line"ERL:END
1800 '
1810 'checksum error
1820 '
1830 PRINT"M/C Data Error!
1840 PRINT"Check lines 1570 to 1610
1850 END
```

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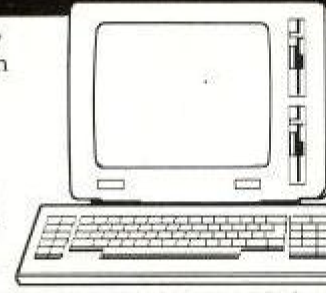
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MISSION GEN

"All that glisters is not gold,
Often have you heard that told;
Many a man his life hath sold
But my outside to behold."
William Shakespeare

Simon Rockman looks at the latest release from Firebird's Silver and finds that it outshines some Gold programs

Budget software houses usually claim that their £1.99 programs are as good as many £10 games, and the latest offering from Firebird bears this out. If you enjoyed Lightforce then you will just love Mission Genocide.

The plot is simple: You fly through space blasting hell out of a motley assortment of aliens and land bases. The thing which makes Mission Genocide really special is the scroll – the screen pans along the alien surface with a smoothness never before seen on the CPC. The majority of the screen scrolls from top to bottom, but a panel at the bottom stays as steady as a rock, showing your score, number of lives and some tactical information.

Your spaceship skims the planet surface. The original game design included tall buildings which you would crash into, but these were edited out – a good job too, since Mission Genocide is difficult enough as it is. You have two kinds of projectile to call to your aid, bullets and missiles. Bullets strike at airborne aliens, missiles at terrestrial targets.

As with all good arcade games, the aliens attack in waves. They don't look too spaceship-like, unless spaceships of the future are to be mutant cherries, but the bubbles are pretty.

There can be up to six aliens on screen at a time, which may not sound a lot, but when you are in the thick of it they form a fair-sized squadron.

All this action consumes a lot of processing power, so much so that it would be very difficult to squeeze any more in. To help you fend off the foe there is an auto-fire option: Press the spacebar and the air fills with gunfire.

You need to fly at the aliens to make the best use of this feature, particularly when a rank of six aliens attacks simultaneously. It takes some skill, and luck, to get all of them, but with the computer worrying about the firing you can deal with bombing.

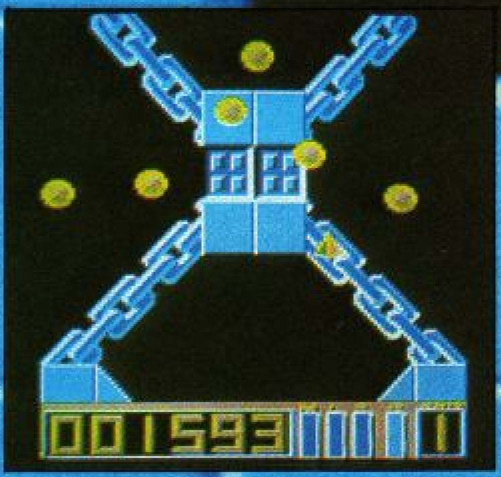
The planet's surface is littered with silos, which open to reveal extra features when you shoot a missile at them. Fly your space sedan over these features and the goodie bolts itself into place.

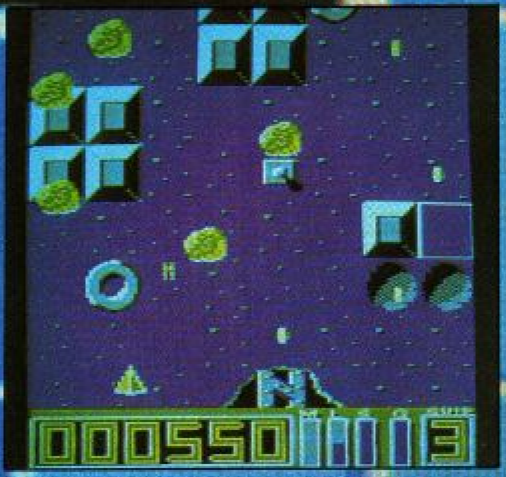
The bullet icon speeds up your rate of fire: Up to two of these can be collected, and the beefed up firing works wonders on your alien killing capability. Similar wonders can be worked on your missiles. The faster they are, the easier it is to blast the silos – and the more bits you can stick on.

The weapon additions are held in place with the help of glue. As this dries the bits drop off, although you don't actually see this happen. To prevent the reduction in firepower you need more glue, which can be obtained from the silos.

Dodging aliens is hard work, but it can be made easier by picking up a speed-up. Like the bullets, missiles and glue, you can take up to two extra speed-ups. The levels of all your accessories are shown on the tactical information chart next to the score.

It is worth picking things up, even if they are not needed. Glue is always drying, and each item comes with a small quantity of the sticky stuff. If the object is not needed the glue is







NOCIDE

kept and the goodie scrapped.

If you scrap enough stuff you are awarded a bonus life. You can, in theory, win up to nine lives – but no-one is going to do that well. A Nemesis–like extra ship was mooted but had to be dropped since it would have been messy.

The best thing to pick up is a shield, which protects you for five seconds after being activated. The clever thing is that the shield is not activated until you are hit, which guarantees that it will save a life. The active shield flashes and it can be used to ram aliens and to destroy meteors which cannot be shot.

Shields are most useful on the later levels, particularly in areas where gun emplacements blast you with a starburst of bullets, and glue does not affect the shield.

One type of silo to avoid is the black hole, as this sucks features away. You should avoid bombing silos as you fly over them too, since a hidden hole could appear. For safety, blast first, fly over after. As the program's author pointed out, it is better to miss a bonus than die in the process of getting it.

The 12 levels progress in deviousness – in one you fly under the planet surface, visible only through holes. To shoot some of the targets it helps to be psychic. The space-freighters on level three are held together with chains and look great.

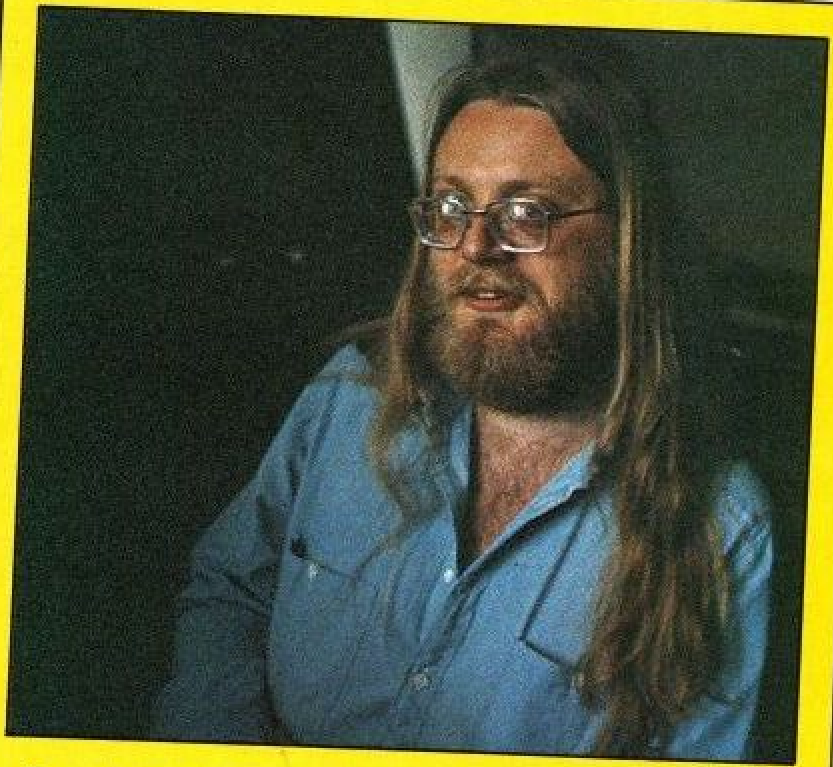
The preview copy I saw was incomplete, but level four was finished – it was initially level one and had been moved when Firebird decided the game was too difficult, too early on.

Mission Genocide demands to be played on two levels, it is a no-holds-barred shoot-'em-up. Switch off your mind and set the phasers on kill. It is also a memory game: Learn the alien formations and what is in the silos. Glue and holes change places but all the other features can be learned.

Remember that anything can fire at you, though in the early stages they don't bother. In the under-the-surface stage, avoid large gaps, as emplacements are designed to fire into them.

Near the end there are some aliens which shoot at you until you shoot at them, and others which don't shoot at you until you shoot at them. But both kinds look the same. Learn which is which and you'll survive. Some periods are starved of silos, so if you know where they are it is wise to stock up on glue before you reach them.

Mission Genocide may be a Firebird game but it certainly glisters.



For almost as long as there have been Amstrad computers there have been Paul Shirley programs. Quack-a-jack was one of the very early Amsoft games, and it is that experience which has led Paul to be the best Amstrad programmer around. He claims that Mission Genocide is his last CPC program – a great pity, but it's some swansong nonetheless.

Laid-back and genial, Paul laughs a lot. He is a dedicated games player, one of his favourite arcade games being I Robot, the Atari 3D stunner.

For Incentive, Paul wrote Confusion, a frustrating and very, very addictive puzzle game. He describes it as "a three month project which took eight months", but then lots of programs are like that.

The most successful program to have sprung from his copy of Devpac is Spindizzy. Originated on the Amstrad it was converted across several formats. Unique and non-hostile, Spindizzy is a huge maze game with over 400 rooms and loads of puzzles to solve. It is now available on compilation and must represent the best VFM in the chart this month. Plans for an ST version have been shelved, but Paul expects his next program to be for that machine.

The graphics within Mission Genocide are stored compressed in four colours, and to generate them Paul uses his own sprite designer which he can hack around as the need suits him. Some of the colours in the preview copy were a bit odd as the game was written on a green screen monitor with some tweaking using an MP2.

Despite his hippy appearance Paul Shirley is as commercially minded as any programmer I've met. He may write the best code possible but will not go over the top on a budget game.

When I asked about the possibility of a starscape he said: "If I was trying to sell it for 10 quid, yes, then I'd go all the way and put stars in. But as it is I think it's quite enough for £1.99". Having played the game I'd say it is more than enough.

ACU

The medium is the message

Rupert Goodwins continues his silicon trip around the insides of your Arnold

Floppy discs, to a dedicated CPC owner, are hard and rectangular. Hence the name. Well that ain't exactly so, the discs the computer uses are round and floppy enough; the familiar overgrown afterdinner mint that users see is the protective cover to keep the nasty, dirty, rough-and-tumble world away from your delicate data. It was not always thus.

Floppy discs, which we'll call floppies like everyone else, are recent additions to the computer scene. The need for data storage (store to ancient hackers) has promoted the evolution of many odd objects. Floppies are merely the most common permanent (non-volatile) way of doing it on micros. There is a long and diverse family tree, starting at the very dawn of CPU time (another ancient hacker joke).

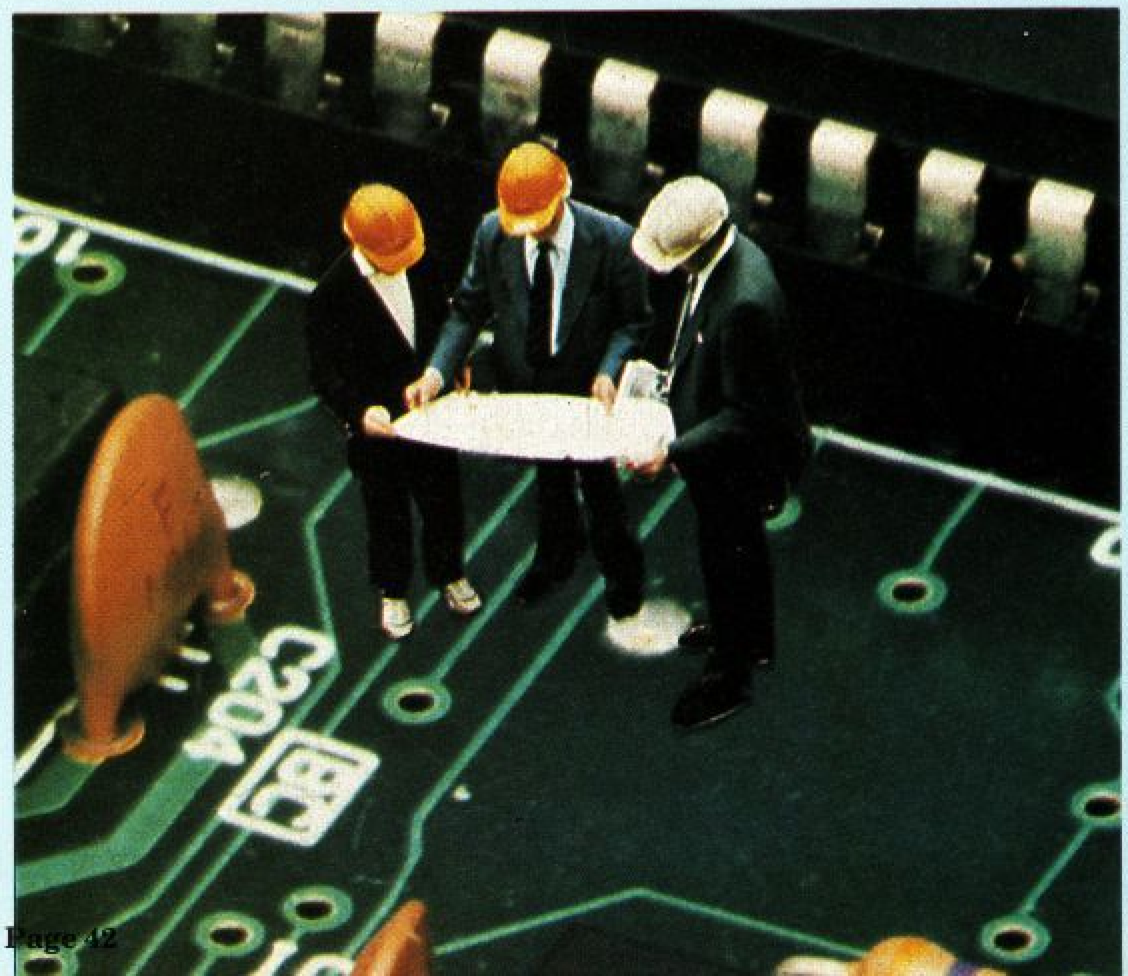
The first storage devices were strange indeed. Two of the more famous were the cathode ray tube and the mercury delay line. The former was based around radar display technology – a pattern written on a screen could be read back if it lasted long enough. The latter stored information as a series of pulses that swept up and down a length of mercury as sound waves. Incredible stuff.

Data storage has always been a necessary part of computers, along with the processor (CPU) that mangled the numbers and the input/output (IO) that communicated the computer's musings to an eager world. Sometimes there was overlap; paper tape punched with holes was both a store and an IO medium in the dim and distant days of the sixties. Mostly the technologies developed along their own lines, developments in one area complementing new ideas in another.

As well as paper tape and punched cards, which formed the most usual type of storage and program input for the first mass-market minicomputers, there were ferrite core stores, tape and drums. Ferrite core acted in the same way as the memory chips in a 464 do now, but unlike modern silicon ram, it didn't lose everything when switched off. Tape recording had many of the principles of disc storage, but drum store was the first real ancestor of the floppy.

Tape and drum were mechanically different, but they used the same principle to write down and read information. They both had one or more recording heads and a form of magnetic medium – the stuff that carries the data. With tape it was a long length of thin plastic coated with a metal oxide, and with drums it was a cylinder coated with similar gunk.

This medium passed over the heads, the only difference being that with drums both the head and the medium moved. With tapes the head stayed still as the medium went whistling past. Just like a Walkman.



Tape, as ex-President Nixon knows only too well, is still with us, but drums have gone the way of the ZX81. They were huge things, with a central cylinder as big as a dustbin and many times heavier rotating at frightening speeds. There are tales of bearings seizing, and drums spinning through several walls into car parks. Ever seen a ZX81 do that? Micro users just don't know how lucky they are...

Next came the fixed disc, which was one or more discs covered in oxide rotating at high speed. The heads moved in and out of the disc, covering a large area. Everything was highly engineered, and it all happened in a sealed box to keep out dust and other horrors. Hence the name. Small fixed discs were developed at Winchester (USA) in IBM laboratories, and this has something to do with their other nickname, Winchesters. As more hard disc drives turn up from Japan, this appellation is falling into disuse.

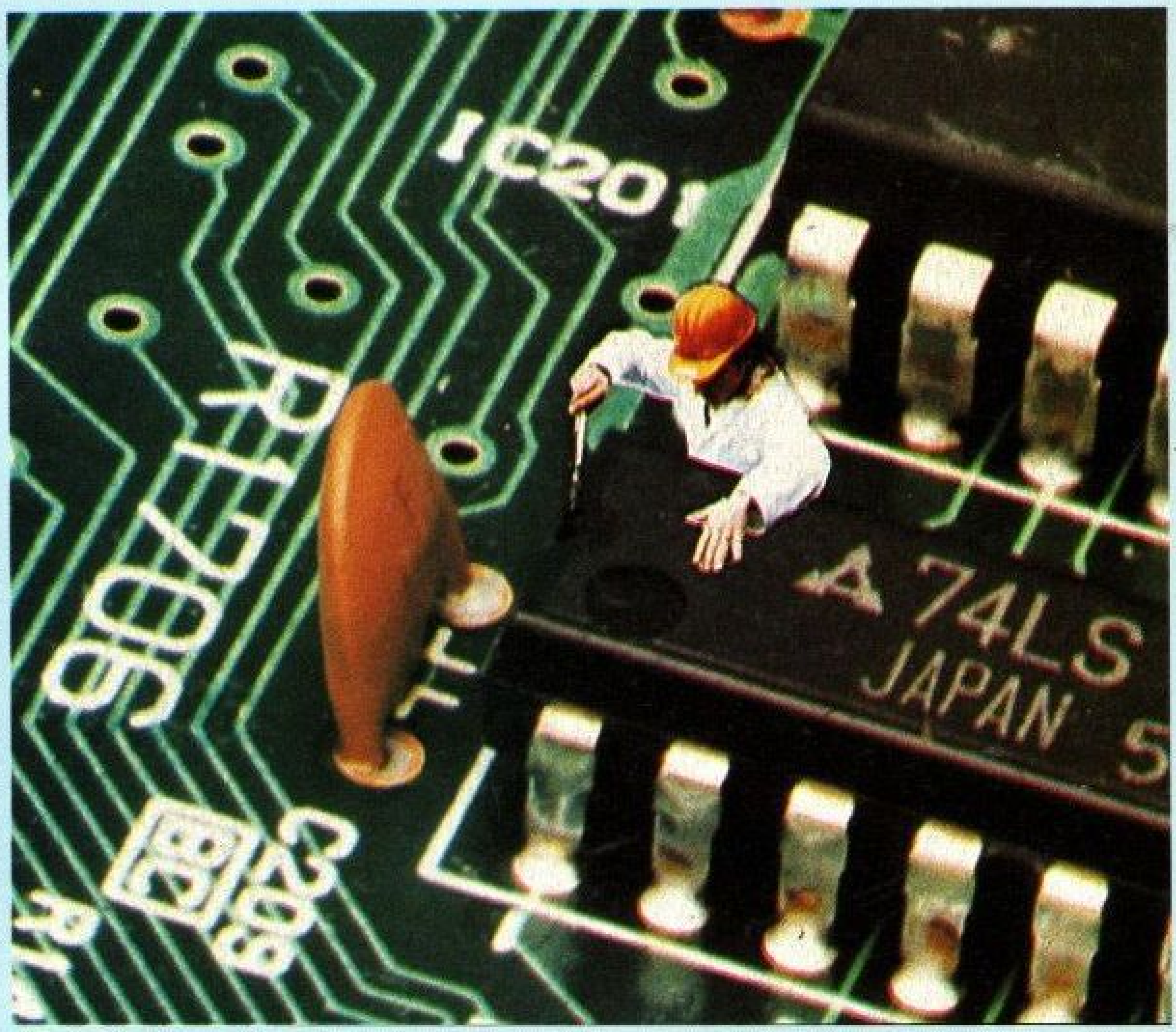
Hard discs were fine as far as they went, but they were expensive and could go wrong. What the world needed was a cheap and cheerful storage method, faster than tape but more convenient than Winnies.

Someone at IBM had a bright idea: Take a hard drive,make everything more robust, slow things down and generally make things simpler. The discs could be removable, and it would be an ideal way of cheaply storing data that wasn't wanted immediately. Hard discs needed to have a metal platter, because they span rather fast. The new removable, low density discs could be made out of cheaper plastic, and made thin to boot. With a flash of light, the floppy disc was born.

Then the micro came along, needing a small, cheap data storage device that wasn't as slow as tape. A marriage made in heaven (well, South California) was on the cards.

Like the original mainframes and

their storage devices, micros and floppies developed side by side. Floppies started life as 8in discs which could store around 128k per side – great when the average micro was happy with 16k of ram. Everything was expensive, but much cheaper than the cheapest minicomputer. Time marches on, and we now have 3in discs holding 720k, with promises of 2Mb drives in the not-too-distant future. And everybody's got them. But how do they work?



Pointing the way

The metal oxide that was at the heart of these devices remembers data by the way tiny magnetic fields point. These fields belong to tiny particles of compound on the surface of the medium, and act a bit like tiny magnets that can swing about to point in a number of directions.

The write head contains an electromagnet that can generate very intense magnetic fields over very small areas of the medium. As the medium sweeps past, this field leaves its hoofmarks all over the place as domains with different magnetic alignment.

Imagine it as a strong wind blowing over a cornfield; the corn gets flattened in the direction of the air currents, and it's easy enough to tell later which way the gusts were gusting.

The equivalent bit in the tape or drum store is the playback or read head; it has a coil that generates a tiny voltage when it passes domains. The voltage can be positive or negative, depending on the alignment of the domains. Circuits clean up the voltage and amplify it to a reasonable level for other circuits which restore the original computer data.

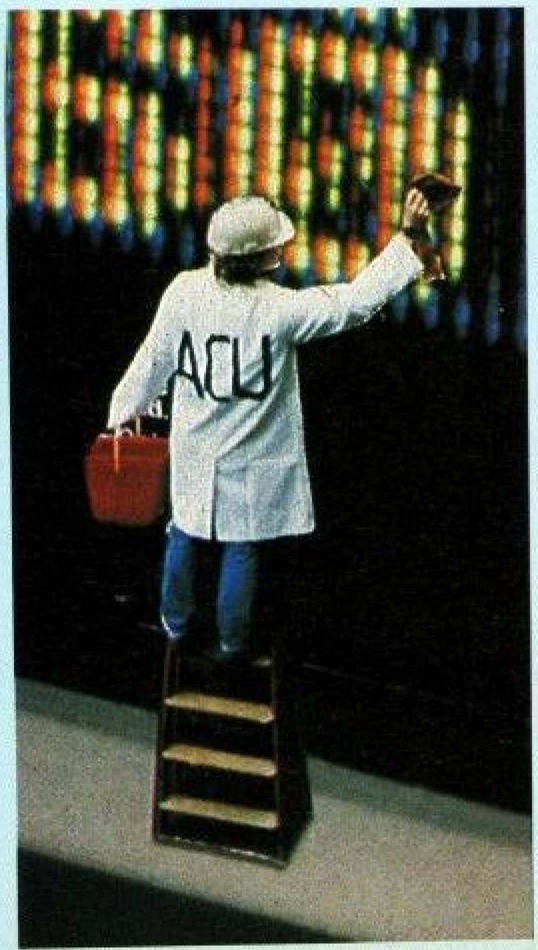
There are lots of different ways in which these circuits can work. Floppy discs have a massively different way of handling the signals than cassette tape data storage, and different floppy systems have different ways of doing it again.

This being an Amstrad magazine, it makes sense to take a closer look at the 3in floppies and their hardware. Fortunately, most "standards" (5.25in for PCs, 3.5in for portables) use the same tricks and circuits. Others, like the Apple Macintosh, use methods all their own which confuse things no end. It's probably best if you forget I ever mentioned them. I will.

As advertised, the 3in floppy disc has underneath its rugged plastic exterior a heart of pure floppiness. When the disc gets inserted into the disc drive, the metal shutter that sits beneath the oval hole in the exterior gets pushed back, and the head comes down and makes contact with the surface of the disc.

Like most modern tape recorders, the read and write heads have been combined into one unit that does both functions. The second drive on the PCW 8512 has two heads, one for each side of the disc, but both of these heads read and write.

The head or heads can be moved by a motor up and down the length of the slot in the casing of the disc, taking about half a second to cover the entire distance. As the disc revolves at five times a second, the head can reach any part of the disc within just over half a second, which makes finding stuff suitably fast.



Packing in the facts

There's another reason why the disc has to revolve quite fast. The greater the difference in speed between the head and the medium, the more information can be packed on to the disc. The signal coming from the head increases with the speed as well, making it easier to get error-free results. 300 revolutions per minute is a fairly good compromise between lots of capacity for data and keeping the mechanics fairly simple.

And, unlike a hard disc, as the heads are in physical contact with the disc itself there is a fair bit of friction going on. The faster a disc turns, the quicker the medium and the head will wear out. And nobody wants that to happen.

Now we have the disc whizzing sedately past the head we need to sort out a way to change the computer's information into magnetic patterns on the disc. As you will remember from the last Computer Journey (wake up at the back there), the computer's data is

all in eight-bit chunks.

It's not possible just to send these eight bits to the head one by one, for a number of reasons. For a voltage to be generated in the read head, there has to be a change in the magnetic field. If all the domains going past have the same alignment, then there won't be any change in the field, there'll be no voltage generated in the head and the floppy disc electronics won't be able to tell what's going on. Bad move.

So there always has to be some sort of change. The usual way is to use a set of frequencies of alternating current, so if the signal coming from the head changed (say) 20,000 times a second there's a 1 recorded, and if it changes 30,000 times a second there's a 0.

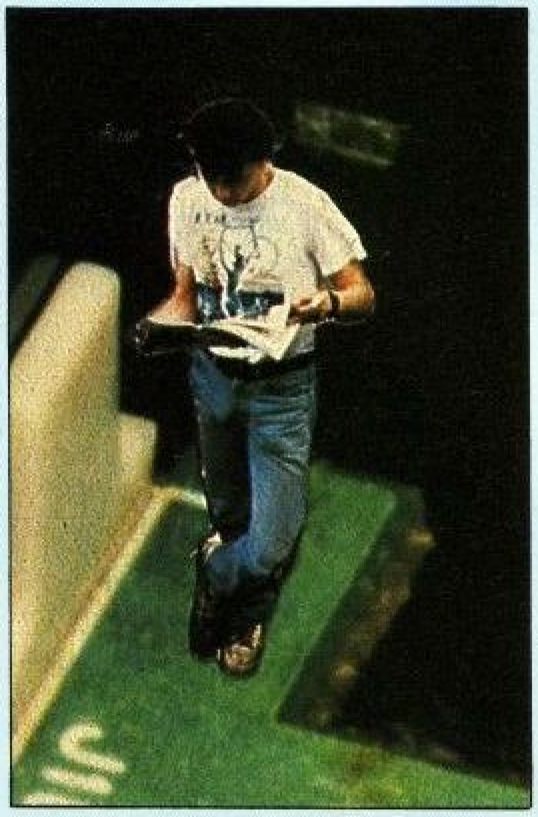


Recording

This trick of changing the frequencies to record information is called frequency modulation, or FM. VHF radio uses the same idea to transmit high-quality programmes, so it's a versatile invention. In fact, Amstrad floppy discs use something called MFM, for Multiple Frequency Modulation, which uses more than one frequency at a time to increase the information that's stored.

The link between the disc and the computer is called the Floppy Disc Controller, or FDC (the compulsory TLA, or Three Letter Abbreviation). Amstrad computers use a Japanese FDC called the 765, which is also used by smaller fry like IBM. It hooks on to the computer in the same way as other peripheral chips like the AY-3-8912, the sound chip.

With the FDC, the computer sends out a set of bytes telling it to move the head to such and such a track, or read a sector; any real data bytes can be sent in the same way. But such data is in for a bit of a mangle.



When the FDC gets the unsuspecting data, it turns it from one chunk of 8 bit into a stream of bits. These get turned into the MFM signal and sent to the disc drive proper.

This drive itself is a good deal more than just a mechanical gubbins. There's a lot of electronics to make sure that the signal makes it on and off the disc safely, and the drive also has the motor switching and head moving control electronics. All this sort of stuff is really quite tricky, but as it comes with the disc drive computer designers like Amstrad never have to worry about the really nasty aspects of disc driving.

In the end, all the data flies on and off the disc quite fast. The FDC needs to be able to send or receive data from the computer at a similar rate, which can be a byte in well under 20 millionths of a second.

There are three main ways of keeping that data moving. The first, which is the most efficient – and coincidentally most expensive – is to allow the FDC to write and read sections of the main computer's memory directly. Direct Memory Access (DMA) means that the computer can be getting on with something else until the FDC finishes a complete read or write, whereupon it will send the computer a signal telling it that the deed is done. This does need extra, expensive, chippery and some quite sharp design work.

The second way is for the computer to send or receive each byte individually, and for the FDC to tell the processor when another byte is due. This is done by virtue of the good old interrupt mechanism (see Computer Journey, *ACU* April)). Consequently, the computer has to sort out interrupts from the FDC and anything else that might be around very fast indeed. Tricky.

The third way, which is the way that CPCs work, is for the CPU to devote all its time to the FDC during a disc operation, constantly checking to see if it's time to move another byte. This does mean that while a disc is being used nothing else (like keyboard scanning) can happen, but it makes for cheap hardware.

Now the knotty problem of where to put the information on the disc arises. It's all very well churning out data and stuffing it on to the medium, but there have to be a few rules to help the computer find it again. It's even more important to stick to the rules if there are going to be discs created on other computers turning up. To a large extent it doesn't matter what the exact details of the structure of the data on the disc are, just as long as there is one.

Data rings

There are traditionally two major components in a disc's data structure – tracks and sectors. Tracks, a little like those on an LP, are concentric rings around the centre of the disc. Unlike a vinyl disc, they don't form a spiral but remain separate.

There are 40 tracks on an average CPC disc, and each is divided into

sectors. Sectors are groups of bytes parcelled up with some extra information to help the FDC realise if there's been an error. A sector is the smallest number of bytes that can be written to the disc, so to write just one byte you'd have to read in a sector, modify one byte and write the whole sector again. But it's all fairly fast, so nobody minds overmuch.

On the CPC/PCW there are 512 bytes to a sector, and nine sectors to a track. So, if you do the sums, there are 512 bytes in each of 9 sectors in each of 40 tracks, or 512x9x4 bytes in each floppy disc. This figure of 180k isn't all available to the user, as the computer uses some of it for the directory.

The directory is a track which just holds the information about what's on the rest of the disc and on what track/sector to find it. The computer must know which track and sector the directory resides in, otherwise it's got as much chance of finding its data as a lager drinker has of finding Skol at a Real Ale festival. Usually, the directory track sits on the first or second track.

The computer also has to be able to find the start of all these tracks. To help it, the kind disc manufacturer punches a small but perfectly formed hole in the disc close to the hub. The disc drive shines a light at the appropriate bit, and as the hole speeds past an electric eye (photodiode to be flash) picks up a pulse of light. Where the hole is marks the start of all the tracks on the disc.

Old floppy systems had lots of holes, each of which marked the start of a sector. As the hardware defined the sectors, these discs were called hard sectored. As electronics has got better and floppies more flexible, everyone can make do with just the one hole. and the software works out the sectoring. And guess what that's called. Soft sectoring? Got it in one.

The computer still has to work out how to use the information on the directory, and how to write its own when the time comes to save something. This management of files and disc organisation is mostly undertaken by a program called the Disc Operating System, or Dos. This takes your request to load or save some data, reads the directory, works out where to position the head and what sector to ask for and goes and tells the FDC.

The FDC only really knows about tracks and sectors, things like programs and files exist in the mind of the processor. The FDC does have one trick up its sleeve though. It knows when something's gone wrong, and it knows how to tell the Dos.

Defectors

A fact of life which all disc owners have got to come to terms with is that errors can occur. For all the fine engineering that goes on, there's always the chance that a lump of grit will grind its way into the disc surface, or a stray magnetic field will persuade some domains to defect.

There are two types of errors, hard and soft. Soft errors occur when the disc drive misreads the disc because some floating hunk of dead skin cells got in the way. Another go at reading the information should remedy the problem, and most computers have enough nous to try a few reads themselves before reporting a problem.

Hard errors are different. In this case some dreadful fate has been met by data on the disc, and the information is no more. There's nothing the computer can do about it, and the user has to decide whether to ignore the error and hope the rest of the information can be retrieved or to abandon everything. On



a large file the data can usually be patched up, but if that ol' devil Disc Error strikes the directory track, you have had it. Write-off.

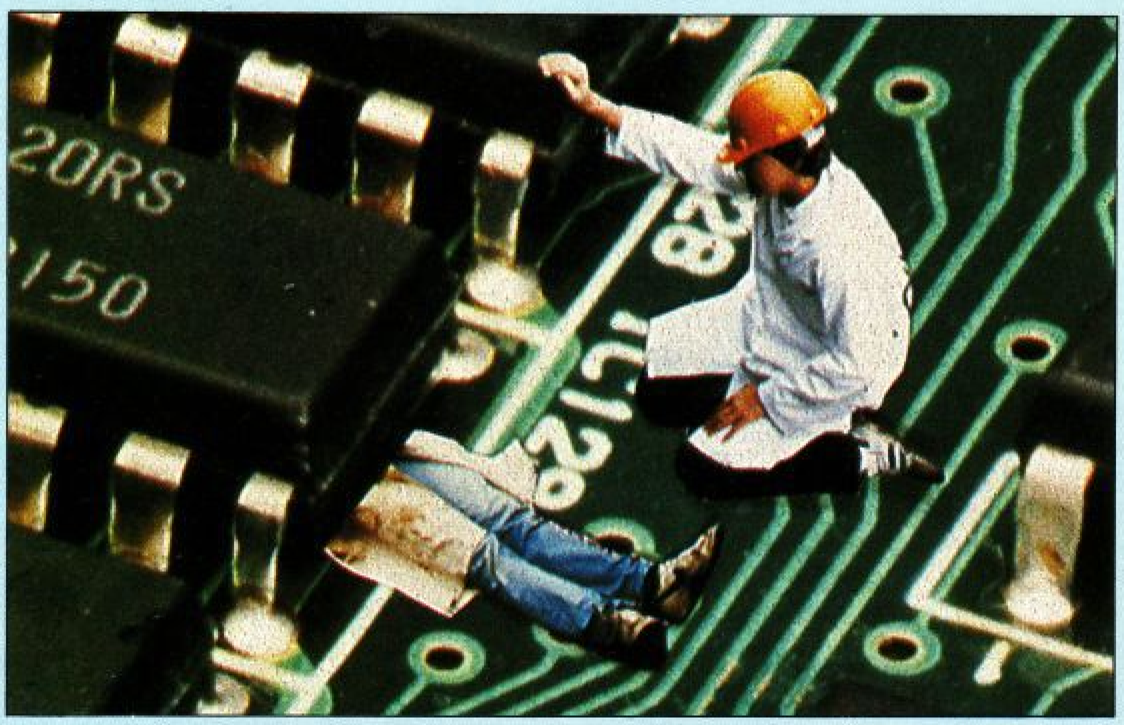
The problem is compounded when you realise that a lot of disc errors occur because the computer is switched on or off with a disc in the drive, causing a spike of electricity to go rampaging down into the write head and splattering whatever bit of disc is in the neighbourhood. And when a disc is in the drive and not being used, chances are that the head is on the directory track. Embarrassing, really.

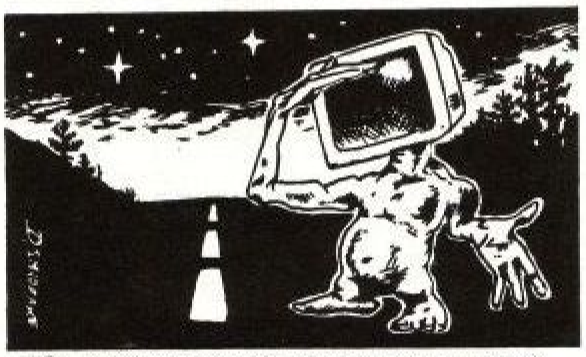
Fortunately, every disc user regularly takes backup copies of any important programs and data, so nothing really vital ever gets completely lost. Or so the theory goes. In practice, user-invoked data errors make a lot of people very unhappy, but now you've read this it'll never happen to you. Will it?

In the future, there seems no limit to the amount that can be crammed on to floppies and subsequently lost. Various people have announced schemes to get as much as 5Mb on to one floppy, and as more people get drives the price can only go one way. The 3in disc drive is now in use in over a million computers, not bad for a standard which came about because the 3.5in disc was just too big to fit a standard Japanese mail envelope.

Now I bet you never knew that before, either.

ACU





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☐	☐	PC 1512	☐	☐	Colour screen
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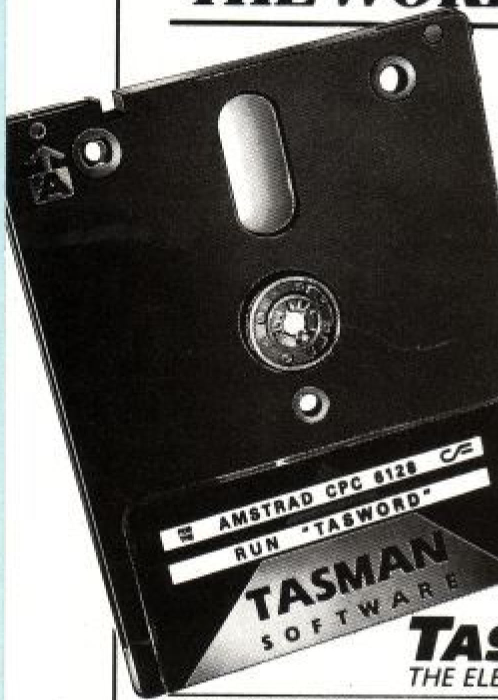
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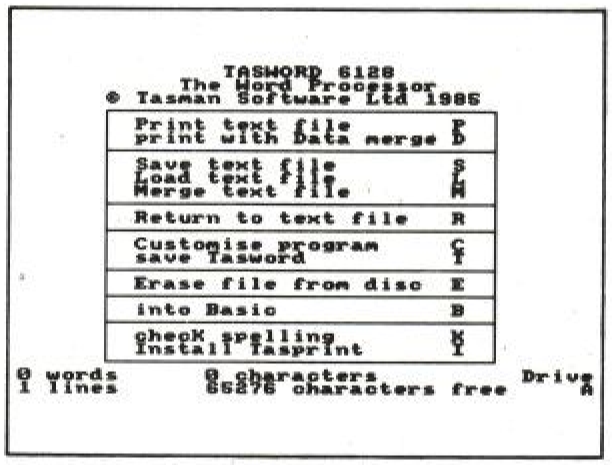
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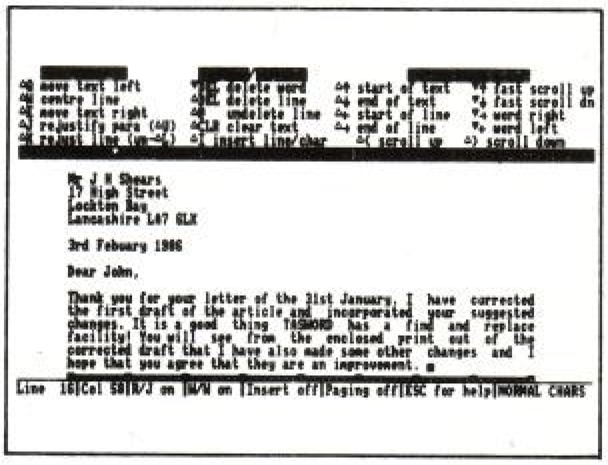
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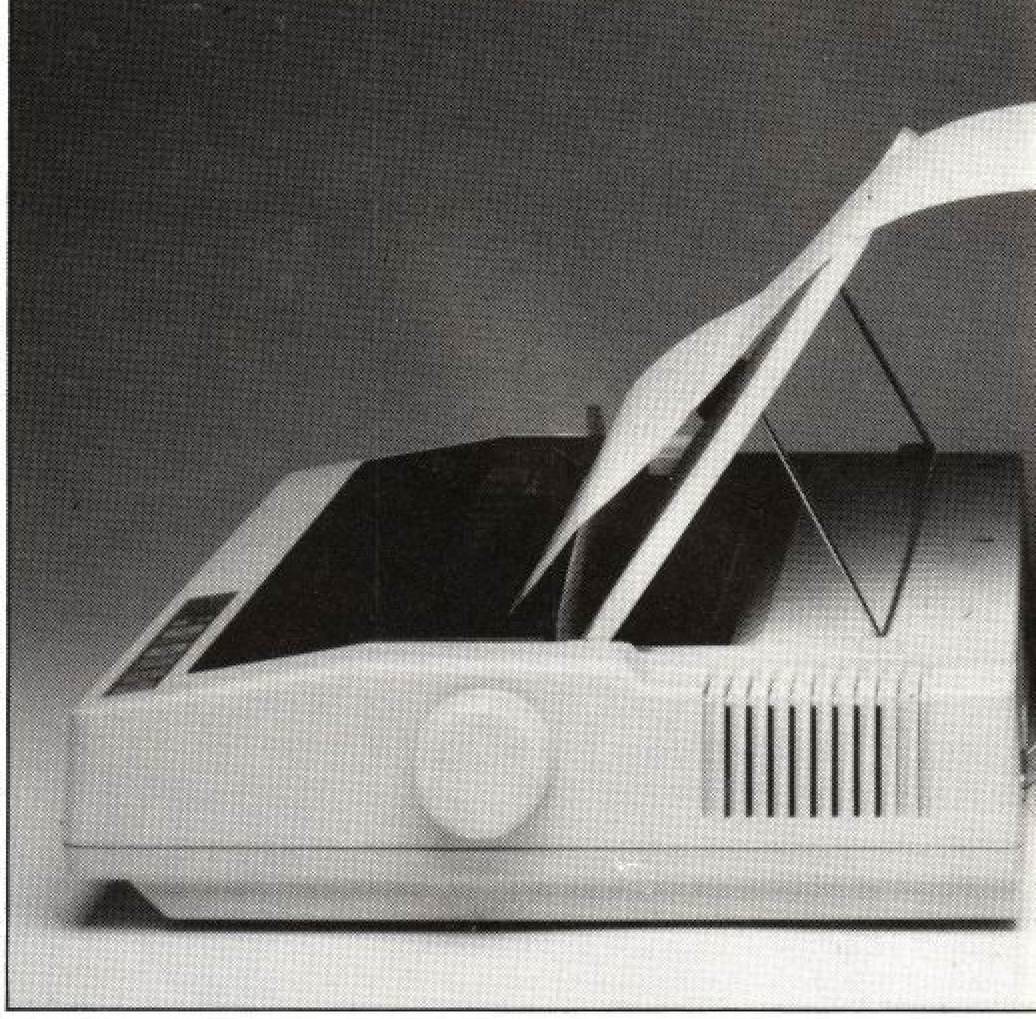
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Printers i



Amstrad's DMP 4000 and Star's NX-15. By your quality correspondent, Dot May Triques. Dateline : Near Lettre, France.

A computer without a printer is about as useful as a weather forecaster without his chart. Until Great Aunt Maud and the bank manager all get PC compatibles and modems, the need for the quaintly named hard copy remains. Printers are tricky creatures to sell, and tricky to use.

Amstrad realised this, and produced the PCW 8256 with a bundled printer. Instant success. Remember, Amstrad could have sold a model without a printer. The fact that it didn't means that it made more money by forcing Joe Punter to buy the printer whether he wanted it or not. A wonderful way to sell the things.

PC printers

Even Amstrad can't – at the moment produce a PC compatible with printer at the magic £400 price point. This time, like everybody else, it has to sell their printer separately. Any printer Amstrad produces for PC use has to be judged against the opposition on price, quality and plain old-fashioned usefulness.

So, in the off-white corner, we have the Amstrad DMP4000. And in the slightly different shade of off-white corner we have the Star NQ-10, fighting for the rest of the market. On paper, the two protagonists seem much the same. Same size(ish), same choices of typefaces(ish), and same(ish), stunning off-white decor.

The DMP4000 is Amstrad's first go at a completely new design of printer for PC owners. Until it was launched, the only offering was the reprogrammed, recoloured, repriced and renamed DMP2000 – the DMP3000.

The design was pretty unbeatable when first pin struck ribbon, but it's a year or two old now and Amstrad's competitors have been getting closer on price. Time, it would seem for another amazing Amstrad hit 'em where it hurts product, printerwise.

Et voila, we have the DMP4000. Is it what the market's been waiting for? It seems to have all the right stuff on paper – IBM compatible, nine pin, 200 cps, wide carriage and NLQ. The Star NX-15 was launched on the same day as the DMP 4000, but Star the company have been producing printers for a bit longer than Amstrad.

It, too, is compatible, nine of pin, wide of carriage and NL of Q. It can only manage a modest 120 cps, however. But what does it all mean?

First things first. IBM compatibility is pretty important. If you've just bought a printer for your PC, you'll be rather keen on the idea that when you print something the right characters appear in the right order on your lilywhite paper, not some strange Serbo-Croat scrawl.

For this to happen correctly, the printer must have the IBM character set (including all the funny lines and signs). Just like the DMP 4000 and the NX-15. For reasons which are not at first clear, there are not one but two IBM character sets, both of which come in two flavours. More on these later.

There is another standard which is widely followed, and it's named after the printer manufacturer that got there first – Epson. It's pretty similar to the IBM standard for normal text, but as soon as the user tries to do anything clever, things diverge fast. The DMP 4000, and the Star, have got Epson too. I should imagine that it would take a long time to find any software that couldn't work happily with either of the printers.

So much for the character reference. How does it make them up? The answer, needless to say, is pins. Now nine pin is not the sort of thing to bowl you over. The way in which a dot matrix printer works is by pulling a vertical line of pins horizontally across the paper. The pins are held in the printer head, and can be pushed towards or retracted, like a cat's claws.

When the printer wants to make a dot on the page, it pushes one of the pins forwards momentarily. To draw a vertical line, it pushes all the pins forwards at once. A horizontal line is produced by pushing one pin on to the page lots of times as the head scans along. Characters and graphics are generated by a mixture of pins firing at just the right time.

It would be possible to get by with just one pin. But as each character needs at least eight lines of dots to be readable, it would take eight scans of the head to build up one line of text. Most lower cost printers have nine pins, so a complete line of text (including underline and decent ds and ps) can be done in one fell cliche.

It's not very good quality though, so the trend has been towards 12 and 24 pin printers, which can produce near-as-dammit typewriter quality lines of text in the same time as it takes nine pinners to go dotty. Rumour had it that the DMP 4000 would be 24 pin. Rumour was wrong.

n parallel



There's a trick that printers can employ to make the nine pins do double service, and produce what's known as NLQ text. Near Letter Quality (you knew all along) involves the printer doing one line of letters as per usual, and then advancing the paper by the merest gnat's whisker before repeating almost exactly the same line.

The second pass of nine dots fits neatly in between the first lot, and the resultant amalgam can pass muster at a distance for typescript.

It stands to reason that each line of text takes at least twice as long to output as the unjoined-up dots of the standard characters, so it's swings and roundabouts time.

Pretty, fast

The DMP 4000 puts a bold face on these goings-on, by being impressively fast to start with. And this is where the DMP and NX part company for the first time. The 200 cps (characters per second) figure gives about two and a half lines of 80 column text per second, or a sheet of A4 in about 20 seconds.

This, it is true, is in maximum spottiness mode, and not designed for begging letters to the bank. But given that most other printers are trying hard for a 100 cps reading in ugly typeface, it follows that all the prettier modes on the DMP 4000 should be proportionally faster than the competitors' equivalents.

The Star's more conservative 120 cps is but a smidgen faster than the rest of the pack. It seems nice and fast – until you run it against the DMP 4000. Using a fast printer is a Bad Idea if you then have to give the thing back. It's a bit like driving on a motorway; the faster speed soon becomes natural and the 40 mph limit at the end seems unbearably sluggish.

Wide carriage, besides being the King of Tonga's transport, is another major innovation for Amstrad printers. The DMP 4000 can take up to 42cm wide paper, which for spreadsheets and graphics dumps can make a serious difference to legibility.

Likewise, programmers whose assemblers produce printerfuls of diagnostic data can find the extra 40-odd characters per line invaluable.

Of course, the DMP 4000 can take narrower paper – down to about single label size. The Star NQ-10 is similar; again there is nowt to choose between them on width alone.

So much for the whats. Now for the hows. It follows that if you're going to have vast sheets of paper whistling along at high speeds, you're going to want a fairly good paperfeed system.

The DMP 4000 seems to be a curious mixture of PCW 8256 and traditional printers when it comes down to passing the pulp. The paper passes into the printer from behind, comes up and over the rubber roller (called a platen, or emergency end-of-paper text buffer in the trade), and is then pulled away by the sprockets. Friction feed paper forgoes this last pleasure.

The initial setting up is done by pulling the bail forwards, a la PCW, by knob on the side which also selects tractor or friction feed. Unlike the PCW, this doesn't then draw the paper in, that has to be done by hand. It's a bit fiddly, but not bad after a few goes.

To help in the setting up the two smoked perspex flaps can be hinged away. Well, the top one can be hinged. The bottom one just falls off in a most alarming manner, and generally is a bit of a nuisance. Evidence of cost cutting, m'lud. The paper is then clipped into place, and the printer's ready to go. But not for long...

The first major difficulty I experienced was with the paper acquiring a slant, and then jumping the sprockets completely. Now paper alignment is a fairly black art, and experience is everything, but it took me a good day to learn how to thread up the DMP 4000 so it would complete 10 sheets of fanfold paper without jamming. Most other printers take me an hour, maybe two.

The trick is to use the wire frame provided to guide the paper in and out of the back of the printer at a gentle incline, and have the sides of the paper exactly parallel to the sides of the printer. The DMP 4000 seems unduly sensitive in this particular, but it is combatable with practice. Just don't expect to produce reams from the minute you first switch it on.

The Star is a trifle more traditional. Tractor, friction and paper feed are controlled by a lever to one side of the carriage, which also sets/resets the bail bar. Paper again feeds in from the back up and over the platen, but the whole process seemed a good deal more solid than the Amstrad. It was more forgiving of misfeeds as well.

There is an automatic paper feed option which claims to take a sheet of paper and set it up for you: I don't like automatic feeders in general and this one was as prone to get it wrong as most I have known.

Like the DMP 4000, the Star had a plastic cover which fell off when it really should have hinged. It also had a most peculiar paper support device, consisting of a sheet of grooved plastic with a hinged metal prop.

This was designed (I use the word loosely) to sit up behind the carriage and hold paper at a suitable angle. In practice it fell over at the slightest provocation, and was completely useless. Most odd.

Notwithstanding the nonstanding

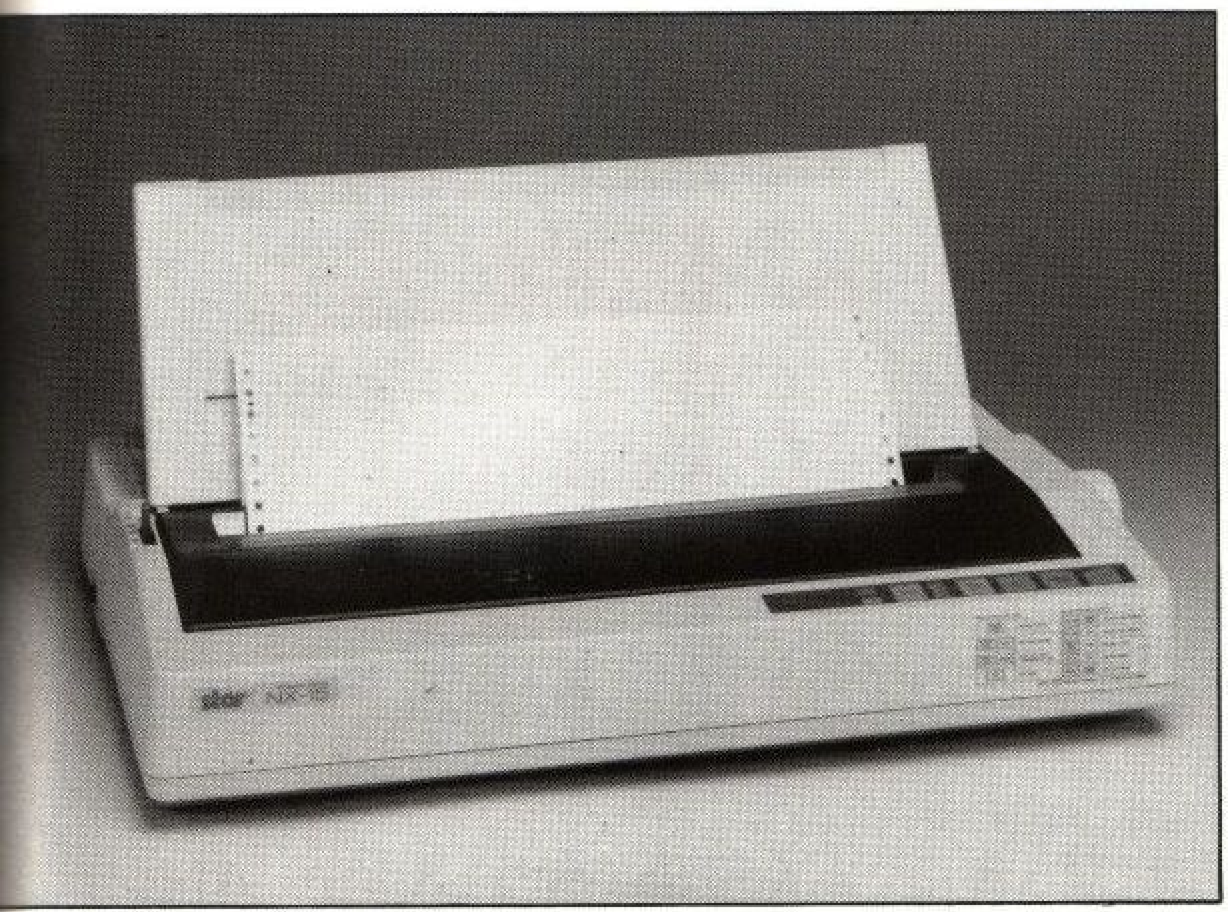


Figure I: Star NX-15

stand, the Star won on paper handling prowess. Given time, both were usable, but the Star produced results quicker.

Having got over that little barrier, it was configure time. Here most printers suffer from manual Janglish. This obscure complaint is caught from an oriental translator whose knowledge of English idiom is slightly better than his understanding of printers. In its most virulent form (the Graficprotocol Incomprehendis), it can cause loss of hair and lacerations of the hand where the sufferer has thrust the printer through a window.

Amstrad has been bashing out printer manuals from Brentwood for long enough to get it right, and it shows. Lots of pictures (with the famous Amstrad Hands twiddling the Knobs) and plenty of worked examples are sprinkled about the place to help the bewildered.

It is biased heavily towards the PC1512 and Basic2; people without this combination might feel at a little of a loss, but common sense suffices in most cases, and the manual is pretty good all round. It has an index.

The Star manual is a little more obscure. Like the Amstrad offering, it gives details of using standard applications software and using the printer from Basic. Unlike the Amstrad tome, it is trite in parts, and (sin above sins) has no index. People who write reference books without indices will be librarians in Hell.

There's also a lot more jargon, and illustrations appearing two pages setting and resetting some well-hidden old problems. To be fair (gnash) everything seems to be there. There might be a little problem in finding something in a hurry, however.

Switch settings

Configuration itself consists mostly of setting the right switches, another potential printer assault course. Rare indeed is the user who hasn't lost a fingernail and a few hours finding, settting and resetting some well-hidden and well-nigh unswitchable switches. On the DMP 4000, they are always getatable, and I had no problem turning them on and off with my porky pinkies. The manual does suggest that the fat of finger might find solace in a ballpoint, but if I can do it barefoot (so to speak), so can you.

The Star is, again, more in the old style. The switches are hidden away beneath the front cover. You can get at them without a screwdriver, though. Ballpoints are definately de rigueur for their setting; even the most delicately manicured will fail otherwise.

However, there are functions (like NLQ and pitch settings) available from the front panel and labelled as such. The DMP has a more sparsely populated front: you can switch in NLQ but it isn't labelled and you have to do it when you switch the printer on. Again, the Star is more flexible in this respect, and easier (but not easy) for the non-hacker to drive.

Both printers suffer from compulsory knob terseness – the Star more than the Amstrad. I am continually mystified by printer manufactures who insist on printing PE underneath the little light which comes on when the paper runs out.

There are always acres of space to print Paper Error, or even a little table to tell you what to do about it. Likewise, TDF where Top Of Form would fit, PWR instead of Power, FWD instead of Forward, and so on. These printers are no worse than any others – it's some obscure hatred of vowels that is endemic in the industry.

On the bench

And thence to the printing. After all, that's what it's there for. The DMP 4000 got a heavy week's workout, as it happened to come along when I was fiddling with some mixed C and assembler programming (showoff!). This traditionally produces lots of dense data, and it seemed that the Amstrad was comfortably two to three times faster than the Epson in use previously.

Characters per second readings are notoriously misleading (Boss: "You said you could type 150 words a minute". Secretary: "I can!". Boss: "But it's the same word. QWERTY". There are posh tests involving stuff called Shannon text which purport to simulate standard English, but the real thing usually suffices. Using old ACU reviews, which are close approximation to the latter, I got a figure of 180 cps, which is very acceptable.

The Star was a little more curtly dealt with, as I only had it in the office for a couple of days. Running the same text tests produced 110 cps, which is about the same disparity from the published count as Amstrad. It's also about the same speed as other printers, a bit faster but not desperately so.

Of good character

The DMP's NLQ modes were OK. I would hesitate to call it a very good NLQ, but as these things go it was clean and legible. The various bold and condensed options all passed with flying monochrome too.

The two IBM character sets (one has just letters, numbers and graphics, the other a selection of foreign characters and some more IBM VDU graphics) can either be dotty or NLQ on switch on. Any mode is also selectable from software, as long as you can understand the package that you're using. Which ain't necessarily so.

The Star's NLQ was similar to the point of boredom. It's mostly a matter of taste as to which is preferable, but the Star was considerably slower.

A pretty good test for the overall mechanical integrity of a PC printer is a box made up of the various straight

lines in the character set.

A number of printers, some quite famous, can't make two bars join up if they're on two lines. The DMP 4000 can and does. It also takes special care over the graphics in the PC character set, always printing them in two goes even if NLQ isn't selected. I don't think this is a good thing myself, as it slows the works down a lot with no option to get back up to speed.

The NX-15 was single pass in dotty mode, and double pass in NLQ. It, too, got the lines joined up.

The Star does have a few party tricks which are absent on the DMP. For example, it can produce triple and quadruple size characters, presumably for posters and banners. A bit of a gimmick; no software will know about them (try telling WS 1512 to format for a character set like that), and the same effect can be produced using the various Gem utilities that PC 1512 owners have at their disposal.

More useful is the Star module system of interfaces. If you want a serial interface, or a bigger buffer, you can just clip one in with no special skills or tools needed. The DMP 4000 needs an external serial-parallel convertor if you want to pull that stunt.

The extra speed inherent in the DMP 4000 was perhaps most useful in taking the pain out of picture drawing. Graphic dumps from Gem and other more esoteric programs were gratifyingly great at graticule generation.

Fast it is, knocking off the old screenfuls of spots at a speed not dissimilar to my old Epson churning out text. In fact, it seemed a little faster than some programs could drive: a print spooler in my possession seemed to disbelieve the speed of the printer and leave embarrassingly long pauses in the output. But as the days wore on, the ribbon wore out...

Tired little ribbon

The DMP ribbon is the smallest I've seen for a printer anywhere near the DMP 4000's size. Unlike the DMP2/3000 and PCW machines the DMP 4000 ribbon fits completely on the printer head, and gets whapped about at high speed. This does mean that it can't be too heavy, but I have my doubts as to its longevity even so.

After two days' medium use it was well past its first flush of inky youth, and soon began to drop descenders and speckle screen dumps. The nearest (in size) Epson equivalent I could find was a LX80 ribbon, and these reputedly last for well under 50,000 characters before getting careworn. At £7.95 for the Amstrad it might well be a source of worry.

The Star's ribbon is more like the aforementioned DMP3000's, it sits on the body of the printer and the full length of the head travel. It's a little more fussy about changing; the user has to move the print head itself (which gets hot), but it can at least hold a useful amount of ink.

No problems were noticed in the days I had it, and I'd be much happier about producing lots of documents without fading with this ribbon. The price is £8, which will probably turn out to be considerably better in pennies/printout than the DMP 4000s.

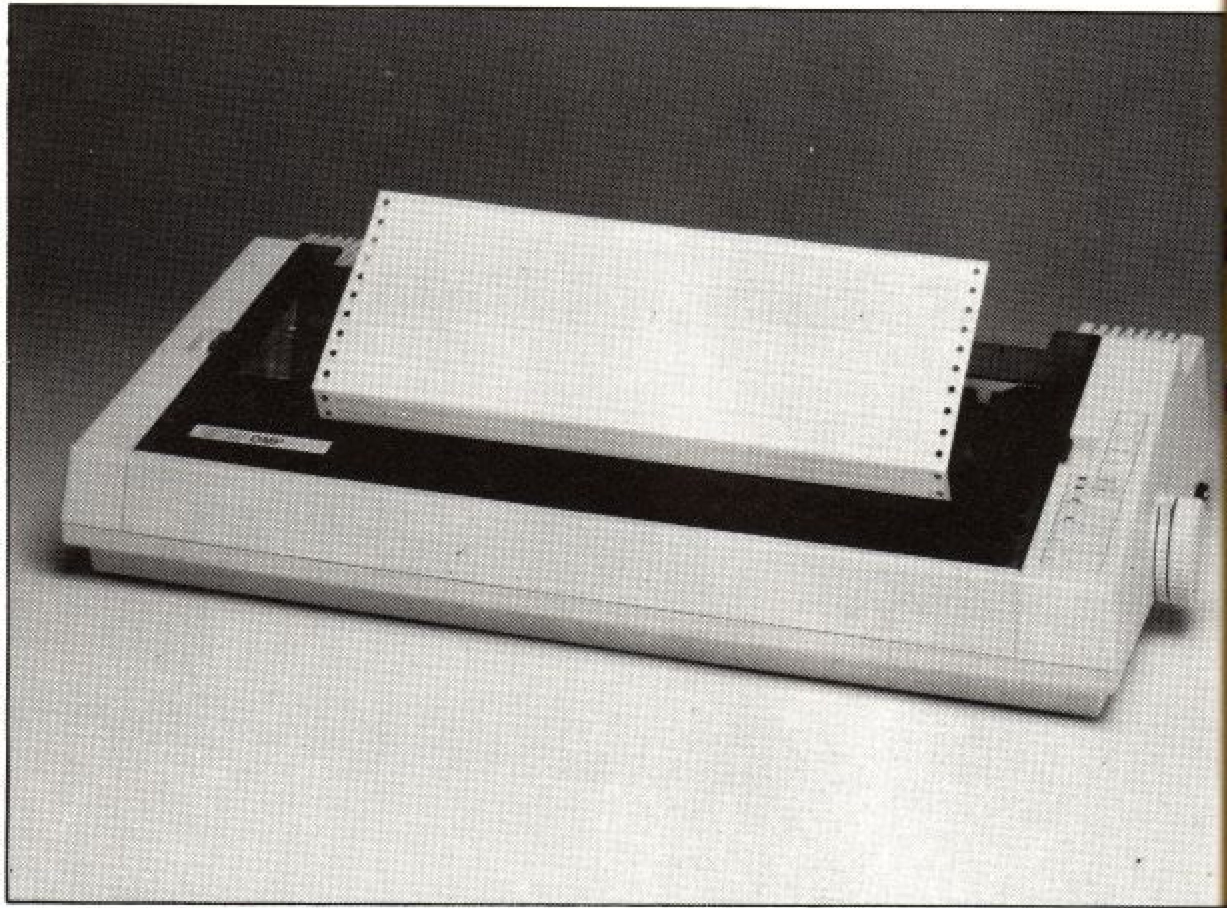


Figure II: DMP 4000

Platen pandemonium

Both the DMP 4000 and the Star are loud. The DMP, however, is loudest. Well, there's a lot of it, and it does nip about a bit, and as printers whirr it's not the worst aural offender by a long decibel. But using it in a confined office is definitely antisocial. Nothing a Walkman and Motorhead couldn't fix. But I'd prefer the DMP 4000.

After a week's slog with the DMP 4000 I must admit that I like it, even given its little habits. I'll probably buy one, because it's made me realise how much I need the extra speed.

But I'm a bit worried about the price. At £250 it would be a bozo bargain in typical Sugar style. It seems designed to fit in at about that price, being notably (but not exceptionally) better featured than a 170 DMP 3000.

The general level of engineering is round and about the same, with many similar points and corners cut. But £180 more? There are some directly competing printers at the same £350 price point, which seem more solidly built even if they're much the same inside, and the usual unarguable Amstrad edge is definitely not there. It feels as if the great marketing machine has slipped a cog somewhere.

The Star is unarguably better finished. It has the feel of a solidly built printer, and is easier to use. It's also got more flashing lights, which probably sells as many printers as it sells hi-fis. At £389, if you don't need the speed, it would be more printer for your money than the DMP 4000. But the extra features do not compensate for the inferior manual, higher price and lower speed.

Alan Sugar wants to be a big noise in printers. The DMP 4000 is big and noisy. It offers value for money, but not Amstrad VFM. If speed and width are two important attributes for you, then I'd go and buy one. Fast printers (and the DMP 4000 is fast) can make a lot of difference to the way you work, much more than you might imagine

Product: Amstrad DMP-4000
Price: £349
Supplier: Amstrad, 169 Kings Road, Brentwood, Essex. CM14 4EF.

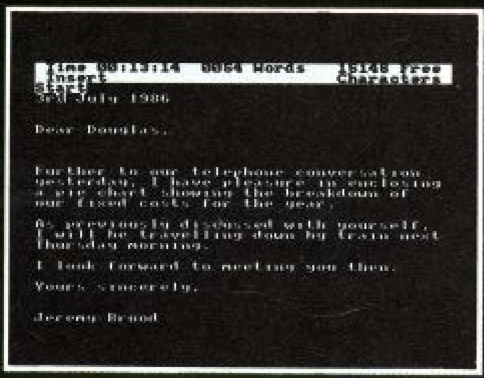
Product: Star NX-15
Price: £389
Supplier: Star Micronics UK, Craven House, 40 Uxbridge Road, Ealing, London W5 2BS.

ACU

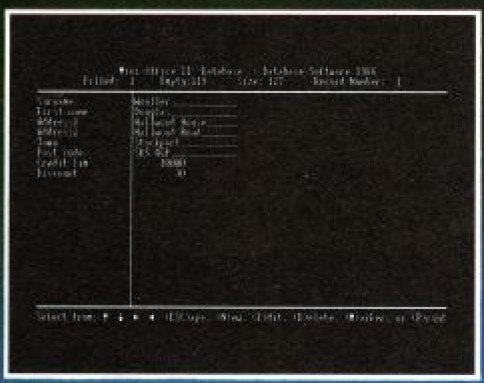


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Is it that easy to use? Several leading reviewers have already sung its praises on this very point.

Yet possibly the best advertisement for Mini Office II is that it comes from the same stable that produced the original Mini Office package back in 1984.

That was so successful it was shortlisted in two major categories of the British Microcomputing Awards – the Oscars of the industry – and sold in excess of 100,000 units!

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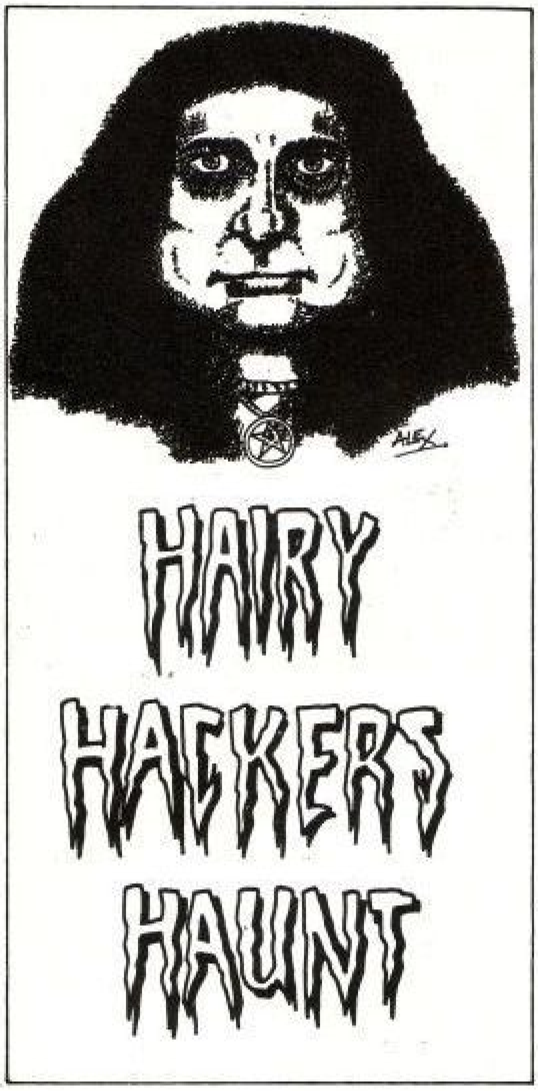
My Access ☐ Barclaycard ☐ no. is: (please tick) ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

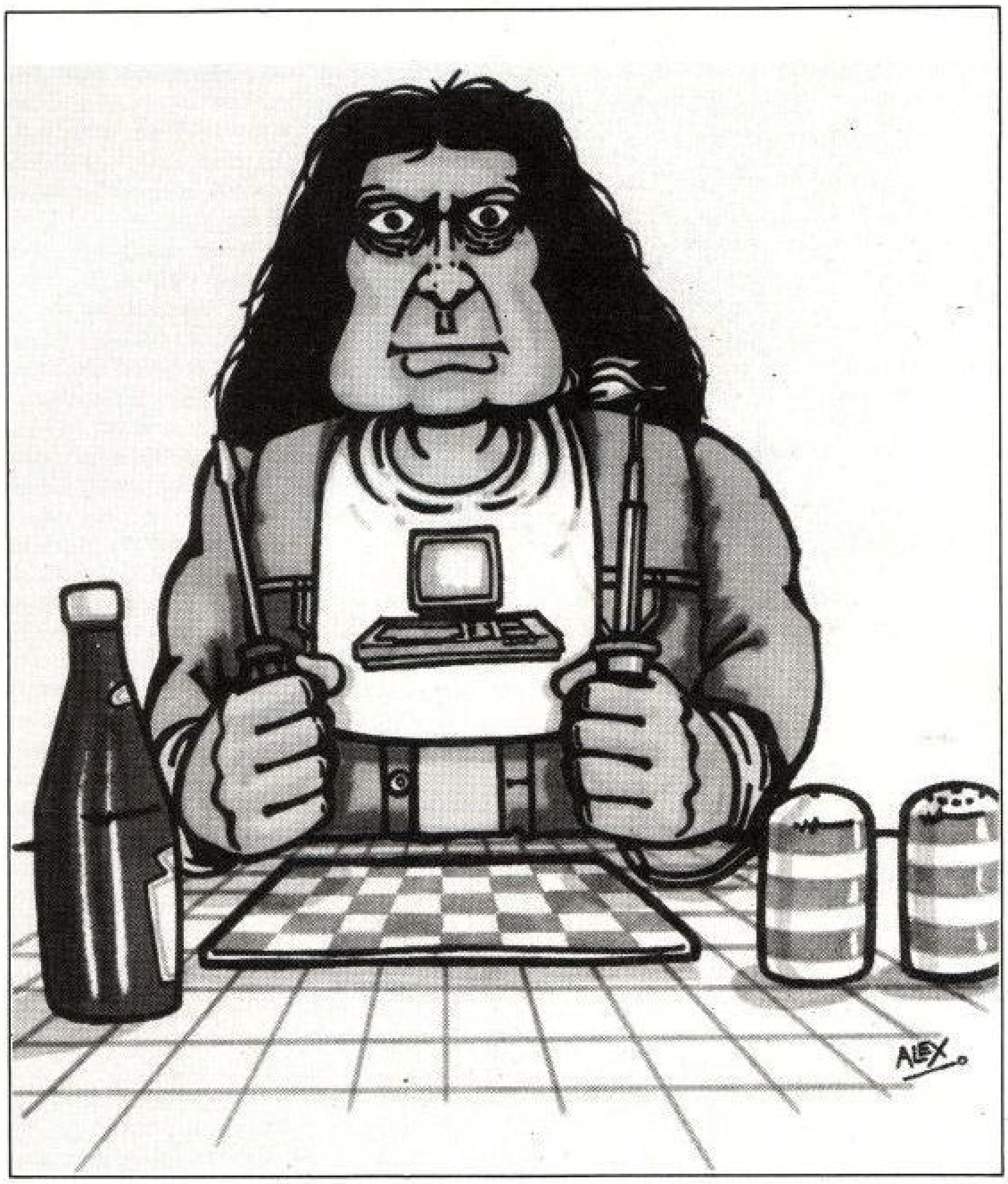
Name ________

Address ________

________ Telephone ________

Opus.





Infinite pains

Another month goes by ... enter Vax the barber's nightmare, stage left

Just one more poke, I thought, it won't do me any harm. I can always turn the machine off when I'm done. It was all right at first, but then I discovered emulators. Now I shake until I hit my next breakpoint, my eyes are red from staring at the screen, the scribblings of hex addresses on scraps of paper have migrated on to the tabletop and manual flysheets ...

Hacking. It really screws you up.

This month, Justin is on holiday, and I'm up a gum tree, so all the stuff in this month is your own work.

To make things worse, this month's mailbag looks like Edwina Currie's fan-mail sack. All been off on your holidays or somesuch I suppose. All right for some, I only got a week off and still had to write the column. Still, some people (hellooo Mr. C.P. Cullen) are wide awake and pokeing merrily away.

His first offering is for Lightforce. The poke removes all collision detection, while still allowing the mug flying the spaceship to zap aliens. This (surprise, surprise) makes the whole thing a bit easier. Rewind the tape, and wind on to just past the file called "LIGHTFORCE", and run this wee proggyette:

```
10 'Lightforce poke by C.P. Cullen
20 MEMORY 7000
30 LOAD "LF",7352
40 POKE &79F4,0:POKE &79F5,0:POKE &79
   F6,0
50 CALL &7331
```

You miss yer loading screen, but you also get missed by the aliens.

The second poke he sent in is for Spellbound. It was brilliant, and even deprotected the game. Unfortunately, a certain editor (who's name is an anagram of IRKSOM CONMAN) noticed, and stomped on it. This is one to go in the big black file until after the glorious revolution.

Mind you, if people sent in pokes like that, and I just happened to miss the fact that they deprotected things, and the writers just happened to forget to mention it, ed wouldn't know, would he? *(Yes-Ed)*

The third and final poke from Mr. Cullen is for Cauldron. I've a feeling we've done this before, but as this month's mail could comfortably fit in a gnomes' jockstrap, I'll print it again anyway. Besides, somebody will've missed it first time:

```
1 'Cauldron. Computer hits 3 version.
10 MEMORY &17FF
20 LOAD"",42240
30 FOR A=&A552 TO &A559
40 READ A$:POKE A,VAL("&"+A$)
50 NEXT A
60 CALL 42240
70 DATA AF,32,4D,DA,2A,A2,00,BC
```

Anyone want to know how to make Vax Snax? Take two or three really black bananas, and slice sticky contents thereof into blender. Add splash or five of lemon juice and blend until it looks like something you'd rather it didn't look like.

Pour on to a tray lined with clingfilm, spread a quarter of an inch thin and leave in airing cupboard until dry (two-three days). Separate from plastic, cut into strips and munch while writing magazine articles. Decide for yourselves if the snax are as tasteless as the articles.

I can hear the ed now: "This isn't a cookery book!", so we'll get on with the lettery.

Michael Kohut of Swillington has written in with a pokette for something downloaded off Micronet. Just in case anyone else has downloaded Killer (it's a Kong look-alike) here's the progykin used instead of KILLER.BAS:

```
10 MODE 1
20 OPENOUT "d":MEMORY &40FF:CLOSEOUT
30 WINDOW 8,33,1,8,20
40 INK 0,0:BORDER 0:INK 2,6:INK 3,26
50 LOAD"!screen"
60 CALL &8200
70 LOAD "!game",&4100
80 POKE &4414,x:'x=number of lives
90 POKE &5118,0:'infinate lives
100 CALL &4100
```

The variable *x* has to be replaced with the number of lives you want, if you're not in for infinite lives. Keep up the good work Michael, but learn how to spell infinite eh?

Now for those of you in Ireland, who may want to join a 'straddy user group on the Emerald Isle. A bloke whose stuff has appeared on these pages before wants to plug a User Group that's trying to set up in Co. Wexford. He's offering a monthly newsletter (tips, listings, and so on – hope I get some of them!), free utility programs every quarter and hardware at discount for members.

There's more: They'll be supplying the sort of stuff it's impossible to get hold of in Ireland and will help people with everything from tape to disc conversion to eprom programming. No piracy though!

If you write in to him, he'll be able to tell you what the number on the bottom line is. So, write to: James R.Cahill, 17 Pairc Mhuire, Ferns, Enniscorthy, Co. Wexford, Ireland.

Here's one that I'd better lay to rest, 'cos someone sends it in every month: If you run Galactic Plague with two joysticks fitted, press the second joystick left when the game starts. This gives you a bonus and shifts on to the next level. Yes, Mr. John Thompson of Plymouth, it does work on all 464s.

Baz of The Great High Castle has written in (yes Baz, I do exist), saying he's found an Auf Wiedersehen Monty poke. He didn't say where though...

If you poke 800 with &C9 before loading as normal, then get the "machine gun" in the first screen – hey presto! (as they say in Tesco's) infinite lives are here. The sad side is that you still aren't waterproof, so don't go for an early bath if you can help it.

Another letter from Eire here (on notepaper with pretty balloons all over it). By the hand of Paul O'Brien, to be sure. Some people play the oddest games still, like one man and his droid for instance. If only everything was as reliable as a Volkswagen. Still, to help your gameplay a little, here are the passwords for the various levels (spelling permitting):

1. None 2. Empire 3. Predatory 4. Ruminate 5. Ryegrass 6. Vacuum 7. Vampire 8. Ragout 9. Chain 10. Aasvogel 11. Blizzard 12. Cloche 13. Calendar 14. Ectoplasm 15. Ecology 16. Ferocious 17. Fetlock 18. Gooseberry 19. Gravitate 20. Up and away

Then you go round again, again. Wonder how they picked those words? Half of them weren't in LocoScript, and I didn't know what an aasvogel was.

Actually, Sigmund Freud would have a field day with the guy who chose those passwords, wouldn't he? We have, roughly from the bottom up: A foolish astronaut, who likes riding wild, psychic horses. He is also a keen arctic gardener, who reads dictionaries and is in on chains. His favourite food is a garlicky stew (to keep away vampires), which he eats while contemplating the downfall of the Galactic Federation, who he considers should be put out to grass.

The final pokey, for the moment at any rate, is from Stuart McSkimming of my own county, Herts. It's for the Hit Pak version of (yes, another) Jet Set Willy II.

He also gave a great tape-to-disc job for it, but Irksom Conman didn't like that either.

Anyways, the straight-up poke is as follows:

```
10 CLS
20 PRINT:PRINT:PRINT SPACE$(12);"Jet-
   Set Willy II poke"
30 POKE &82A8,0
40 CHAIN MERGE "!JET.BAS"
```

There, not too painful was it?

Right, my parting message is for someone who has me puzzled. Last month I got sent two blank sheets of paper in an envelope. This month, one blank Activision compliments slip. Is someone trying to make a monkey out of me?

Love, Vax & Wifey

Yippeeee – Justin is back, and doesn't he look brown? Well can't hang around all day how 'bout some pokes? Collision detection removal for Mastertronic's Chronos coming up...

```
10 MODE 1:OPENOUT "d":MEMORY &7FF
20 BORDER 0:INK 0,0:INK 1,24:INK 2,2:
   INK 3,6
30 tot=0
40 FOR n=&BE00 TO &BE21
50 READ a$:a=VAL("&"+a$)
60 POKE n,a:tot=tot+a
70 NEXT n
80 IF tot<>3606 THEN PRINT"UT! theres
    an error in the data.":END
90 CALL &BE17
100 LOAD "!chronpic",&C000
110 LOAD "!",&800
120 CALL &BE00
130 DATA 21,00,08,11,00,03,01,13
140 DATA 95,ed,b0,af,32,b4,87,3e
150 DATA c9,32,b8,87,c3,df,8f,21
160 DATA dd,59,11,20,00,cd,ab,bb
170 DATA c9,4a
```

Infinite just about everythings for CRL's Academy. Omit the lines containing any functions that are not required (lines 230-290). Make sure line 300 is left intact though. Important that.

```
10 MODE 1:MEMORY 12345
20 tot=0
30 FOR n=&BE00 TO &BE14
40 READ a$:a=VAL("&"+a$)
50 POKE n,a:tot=tot+a
60 NEXT n
70 IF tot<>2023 THEN PRINT"Arf! Arf!
   Better check lines 200-220":END
80 READ a$:IF a$="end" THEN GOTO 110
90 a=VAL("&"+a$):POKE n,a
100 n=n+1:GOTO 80
110 LOAD ""
120 CALL &BE00
200 DATA 21,09,be,22,40,bf,c3,02
210 DATA bf,21,12,be,22,af,00,c3
220 DATA 50,00,af,67,6f
230 DATA 32,f3,8c:REM Infinite missil
    es
240 DATA 32,17,8d:REM Infinite Amms
250 DATA 32,41,8d:REM Infinite Flares
260 DATA 32,66,8d:REM Infinite Delay
    bombs
270 DATA 22,c7,8c:REM No laser heat
280 DATA 22,47,a0,32,ec,8b:REM Infinit
    e fuel
290 DATA 22,c2,a3:REM Infinite shield
300 DATA c3,35,05,end
```

Infinite lives and Selectable Start level on Gremlins Krakout

```
10 MEMORY &40FF
20 MODE 1:INPUT "Start Level 1-100 ",l
30 IF l<1 OR l>100 THEN GOTO 20
40 l=l-1:tot=0
50 FOR n=&80 TO &B2
60 READ a$:a=VAL("&"+a$)
70 POKE n,a:tot=tot+a
80 NEXT n
90 IF tot<>3698 THEN PRINT"EEEk! Bett
   er check the data lines..":END
100 POKE 168,l 110 LOAD "",&4100
120 CALL &80
130 '
140 DATA f3,21,00,41,11,00,01,01
150 DATA 00,02,ed,b0,21,95,00,22
160 DATA 05,01,c3,00,01,af,32,3a
170 DATA 7b,21,a7,00,11,bf,52,01
180 DATA 0b,00,ed,b0,c3,94,4e,3e
190 DATA 02,32,94,52,00,3e,02,32
200 DATA 95,52,4a
```

That's all folks.



THUNDERZONE

Firebird treads dangerous ground with its latest cheapie, Thunderzone. This spaceborne give-'em-hell has the standard enemy saucers to laser, but the evil aliens are called (lets whisper it) Zircons.

Earthlings of the Guardian-reading persuasion will remember the case where the Duncan Campbell Being came under no little flak for mentioning a satellite of the same name in a (subsequently impounded) TV programme. Since then, the merest whisper of Z**c*n is rumoured to bring burly uniforms down from great heights to protect National Security.

But Firebird is made of stern stuff, and now you the player can aim lasers at aptly named chunks of space hardware. Chuckle. The story goes that a vital mining settlement on Flavius V (hmmmm...) is under attack, and you the hero are sent up in your space fighter to marmalise the Zirconians.

From your pilot's seat in your craft the view is a bit too clear for comfort. In the big screen, those Zircon satellites swirl and shoot. Below that, there are various icons showing the state of the shipborne weapon systems. These show the sector status (how many nasties infest your area), damage level (guess...), compass settings, power level, speed, what sort of weapon is currently ranged against the forces of Zed, and the repair droid. All important things to bear in mind as you veer from vector to vector in battle against them the aliens.

As is common in spacefighters, the entire shooting match is controlled from a late-twentieth century invention, the computer joystick. First noted in the mid-seventies attached to a Space Invader machine, this control mechanism has evolved until it can handle a complete craft. In this case, pushing the stick forwards accelerates the ship, movement to either side changes the compass setting (and thus the direction of thrust), and pulling back switches the control icon.

The control icon shows which aspect of ship functionality is activated by the final control on the joystick, the fire button. If the laser is selected, the fire button causes megawatts of photonic death to leap towards anything that has the misfortune to be flying directly in front of the ship.

A couple of backward tugs on the stick engages the scoop. This interesting machine reaches out from the craft to pick up any energy packs that might be floating around at the appropriate locus in space. These help repair and refuel all the ship systems. The scoop can also make a mess of aliens, which is all to the good.

If things get too sticky, the control icon changes colour as it passes under the systems in trouble. This is usually an indication that it might be a good time to employ that repair droid.

There are lots of sectors to clear of the Zircon menace. Each must be completely free of the invaders before you go on to the next, or they'll take advantage of your absence to replicate themselves and you'll be no better off than before. It's no good wiping out 99 per cent of household evildoers, it has to be 100 per cent or nothing. So go for it!

Author: Firebird
Price: £1.99

Nigel

There are two games in one with this £1.99 Silver release. Number 1: Zap the Aliens. Number 2: Guess which screen shot on the packaging is upside-down. I'm glad to report that game number 1 is more fun.

True, it's all been done before, but there's definitely two quids' worth of game for the trigger-happy and light of stick. Mind you, the controls take a lot of getting used to as the veteran starship trooper might well find the peculiar joystick usage confusing. Worth the candle.

16/20

Liz

Budget games have become the potboilers of the computer industry. This game has a few novel twists, the compass control for one, but otherwise is a straight first person shoot-'em-up. If it's raining and you are bored then it is a cheap afternoons entertainment, but don't expect wonders.

14/20

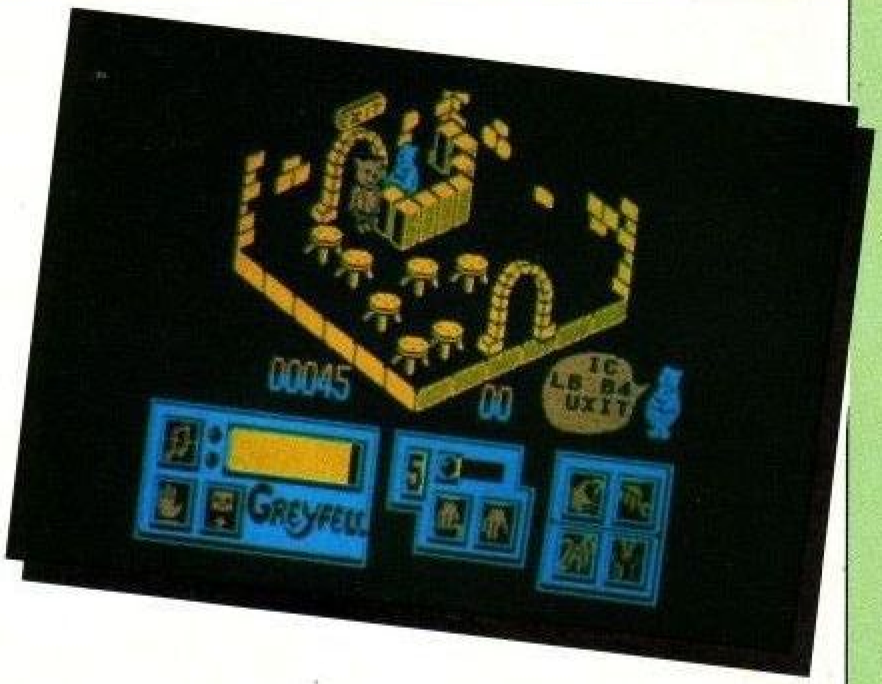
Colin

And the prize for the biggest on-screen scoreboard goes to Firebird, for their third of a screen effort with Thunderzone.

Seriously, the profusion of budget games must encourage experimentation, and the game control is novel if nothing else. For such as I, used to steering the ship by up/down/left/right stick control, it can be difficult to manage the Thunderzone system. But it's a competent enough budget game unlikely to disappoint.

17/20

GREYFELL



Time for a strange tale concerning the end of a cat. The evil Mauron has stolen the Orb of Life from the land of Greyfell, and chaos walks abroad. One cat, braver and drunker than most, decides to undertake an Epic Quest to overthrow the orbsnatcher and restore light and happiness to the benighted place. In short, this is the legend of Norman. Now you're tolkien.

There are the customary obstacles in the way of Norman the moggy on his valiant search. As well as the standard issue adventurer stoppers (rats, wolves, killer tomatoes, crocodiles, skeletons and others of that ilk), there are little delights such as the cat-eating plants, the minotaurs, the Lord of Mirrors and so on and so forth. Most if not all of these are bad news to touch, and some (like the felinophagic vegetables) are positively killers, my dear.

Being a cat does have its advantages. Nine lives is possibly the foremost; the next most life-prolonging attribute is the ability to cast spells. The three that Norm sets out with are Bubble, Cloud and Freeze. All of them are aptly named. All of them kill rats. The rest of the monsters, if they succumb to any spell, only succumb to one. You have to find out which one to survive.

There are numerous small buildings dotted around Greyfell which may well contain clues. Unfortunately, they also seem to contain a variety of cactus to which Norman is especially prone. When you consider that some of these places are pitch black, only lit briefly by the stray light from Norman's magical demise, you should begin to understand the enormity of the task facing our rapidly-sobering hero.

There are people of Greyfell who are prepared to help him. They carry useful bits of cryptic information around with them, divulging away on contact or on being bribed with a suitable object. These characters include Blotto, a drunken rabbit (there's a lot of boozing going on in Greyfell), Potbellius the landlord bear and other quaintly named animals like Offalorien the spy. Beatrix Potter meets Harold Robbins.

There are some surprises in store. I mean, would you expect to find an area with low flying meteorites? Still, it is apparently possible to use just this sort of thing to your advantage, by meteorically bumping off a few of your less welcome followers. Failing that, you can always try punching them or even some of your limited spell power.

Adventurers will note the options available gamewise. There's a save-to-memory facility (but not a save-to-tape). Various spell casting and object juggling can be done through a fairly off-the-shelf icon system at the bottom of the screen. Failing everything else, there's a Throw in the Towel coupon in the instructions which will bring ridicule and a hint sheet by return of post (maybe).

And finally Esther, a quick peruse of the multilingual instruction sheet reveals that the Dutch for Stamina Meter is Uithoudingsvermogen. An invaluable aid to conversation should you ever find yourself in Holland on a blind date, I'm sure you'll agree.

Author: Starlight
Price: £8.99 (cassette), £14.95 (disc)

Nigel

Hmmmm... The rather well drawn characters and striking graphics point towards (perhaps) a game for the preteenage Arnold owner. Certainly there's not a lot in it for sophisticates, except perhaps the name of the spy character. I tried to find a suitable kid to try it out on, but the local shop had run out. I dunno. Can you take a game subtitled The Legend of Norman seriously? Plot weak, graphics OK but a bit cute, overall odd but mainly OK.

15/20

Liz

I cannot think of a single 3D mazey type game which has been an arcade hit. Perhaps they take too long to play. This would take too long for sure, and the joystick controls are weird. You need to hold fire to jump, and different things happen under different circumstances. A game to be avoided.

8/20

Colin

Yawn. This is a cross between Feud and every 3D style game you have ever seen. It lacks the cunning of Head Over Heels and the cute graphics which make that kind of game special. It is also terminally slow. The idea of going into huts makes the map a little more interesting but I felt that it had been slanted towards the younger player because no mature gamester would have the patience for it.

7/20

NETHER EARTH

Five aeons ago the Insignians burst up from the Earth's mantle and partook of a little enslavement. Now they dominate the surface, with huge war factories churning out massive warrior robots and other devices of subterranean nastiness. Some of these are neutral, controlled by enslaved humans and likely to support the rebels. Others are run by the Signies themselves, and will only succumb to a massive assault.

But now, thanks to Captain Fergus McCaffery, there's a small chance that us humans will regain control of the place. McCaffery (the mystery Cap) has gained control of Kerberus, some lasers, motive devices, power plants and assorted weapons.

The first task is to gain control of factories and knock out some robots. These can be kitted out in a number of permutations and then sent out to take over yet more production facilities. The time will come when the robots will be numerous and powerful enough to challenge the Insignians, but for now it's probably best to get supply lines going.

Once a set of small robots have gone out and found the neutral factories, a set of bigger and better bots can be equipped and sent out to take over Insignial-controlled factories. This is where things get much more tricky, as this sort of action is guaranteed to annoy the monsters from the Moho. The final stage involves a set of nuclear bombs in suitably destructive conjunction with those insidious Insignians' war bases.

The game starts out in an airborne reconnaissance unit. This can be flown around the place (depicted in standard isomorphism) to assess the state of play, and can also dock with the warbase to control production. During construction control,a list of available resources is displayed, and robots can be built from the available parts.

There are various types of weapon and transport, and the choice of electronic defence measures. In general, the more powerful and flexible a robot is, the more



resources are used in construction, so careful planning is needed to maximise the effectiveness of production.

Once a robot has been built, it can be programmed to go out and do it to them before they do it to you. It can also hang around and defend a position, move around to fortify an area, or seek and capture (or destroy) various items of hardware. During the final stages of the war, it might be a good idea to avail yourself of the direct control facility of a large nukebearing robot. In this mode, you control the direction and firepower of the robots directly – their intelligence is otherwise somewhat limited.

During the game, robots can be reprogrammed from the flying flitter. But it does help to have everything planned out from the beginning. Game interface is all joystick and menus, with a spot of direct steering for those tricky annihilation sequences. But definitely a game with more tactics than most.

Author: Code Masters
Price: £1.99

Nigel

From the Nether Regions they came, spraying all in their path with a stomach wrenching liquid and showing vile TV adverts. The Insignians had arrived! I don't think the name of the baddies in the game was chosen entirely at random...

The game itself is surprisingly good. The idea of assembling a robot army has been badly done in the past; this is the best and most painless to play version I've seen. Sensibly abandoning incomprehensible icons for wonderful words, the joystick usage is intuitive and (mostly) helps rather than hinders play. Lots of thought has been poured into this game, and it shows.

17/20

Liz

This is the kind of game that Telecomsoft (Firebird/Rainbird) would put in an expensive box with a book, playguide, and a bit of card and then sell for an arm and a leg. All because you have to think before you play. A sigma 7 view of the planet surface in Mode 1 looks good and I would guess, although I don't know, that this was written by the same programmer as Agent Orange.

16/20

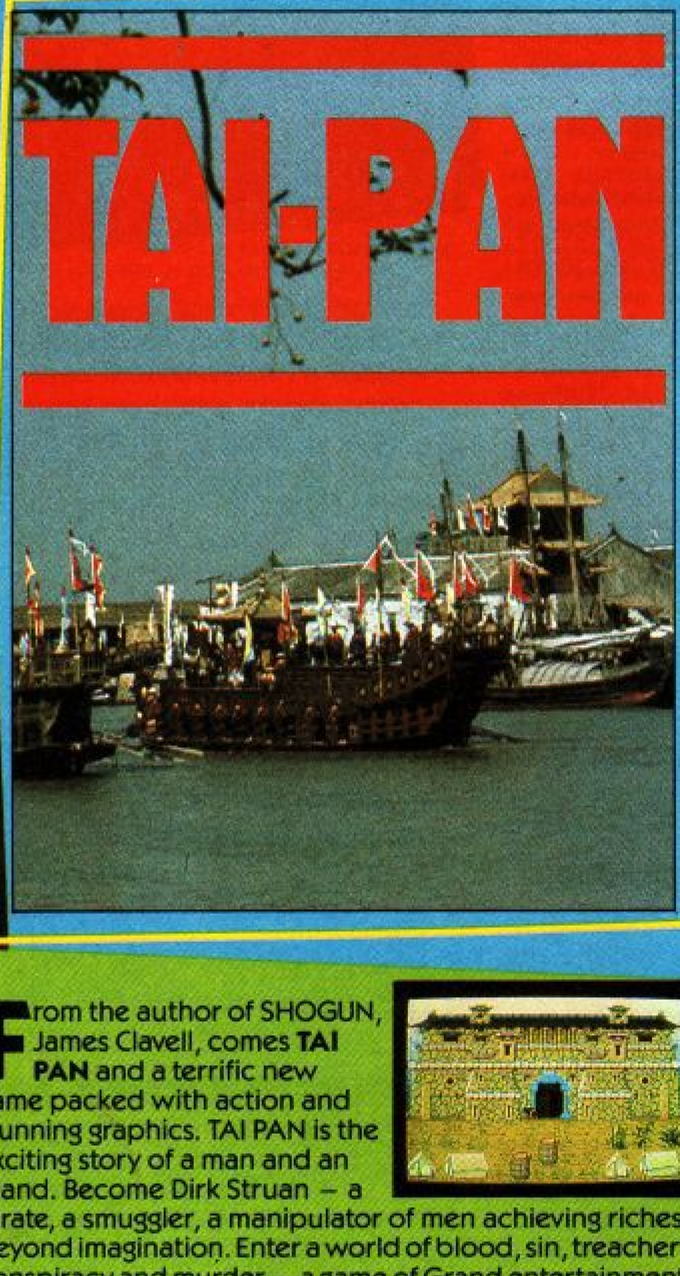
Colin

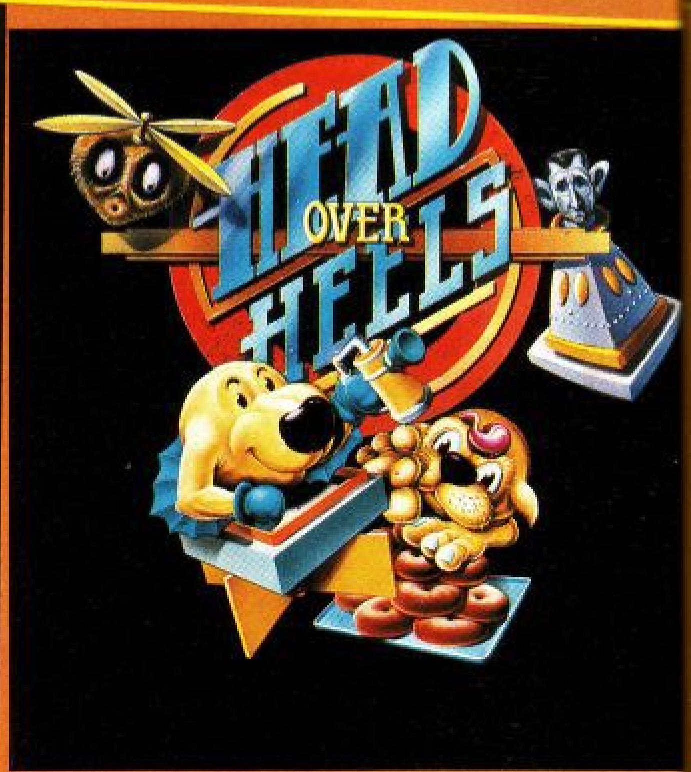
Gasp! Argus produces playable game horror! Had to happen one day, and I'm glad I was here to see it. I don't like strategy games much, even (especially) when they're disguised as something else.

This is a bit different, as implementing my careful plan of action (hint; follow the sleeve notes) was simple, nay fun, and watching the results unfold almost enjoyable. Which must translate to you incomprehensible people out there who enjoy such things anyway as a game of incomparable excitement. And the loading screen is superb...

18/20

THE ART O





From the author of SHOGUN, James Clavell, comes **TAI PAN** and a terrific new game packed with action and stunning graphics. TAI PAN is the exciting story of a man and an island. Become Dirk Struan – a pirate, a smuggler, a manipulator of men achieving riches beyond imagination. Enter a world of blood, sin, treachery, conspiracy and murder – a game of Grand entertainment!



Authors of No. 1 Blockbuster, Batman, Jon Ritman and Bernie Drummond present **'Head over Heels'** – Hi! My name's Mr. Head. Some say I'm the one with the brains but I don't think my flat footed friend would agree. I'm a real sharp shooter, but without my pal Mr. Heels I'd get nowhere fast . . . or slow! I can jump like a flea and even glide but Heels is the Daley Thompson of the two of us – he's FAST! Together, if we can find each other, we really do make an awesome twosome, and that's the only w we can overcome the emperor Blacktooth.



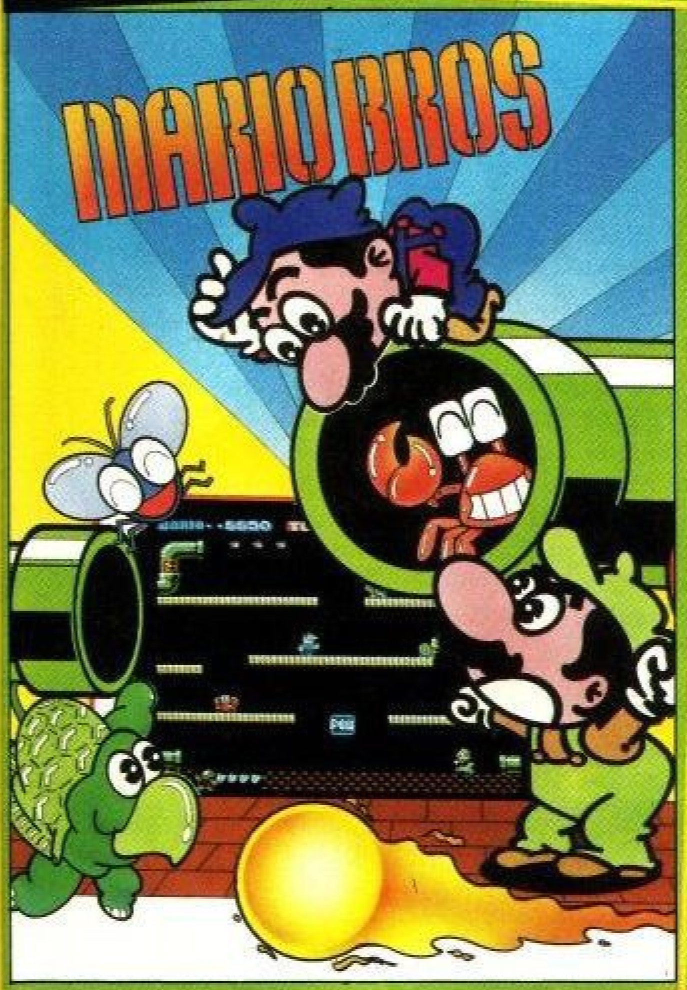
IS PLAYING T

Screen shots taken from various computer formats.

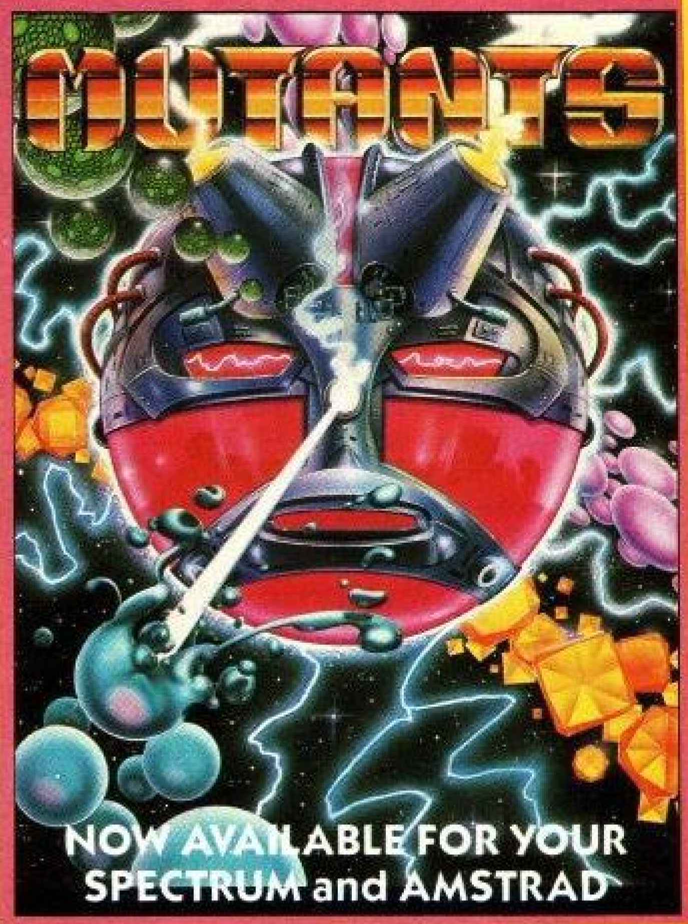
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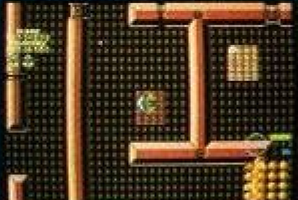
OF GAMES







Now hot from the arcades comes Nintendo's Mario Bros for your home computers featuring Fireballs, Sidestepper, Fighterfly and of course – Mario and Luigi! Flip those pests and kick 'em off the pipes, but don't lose your footing on those slippery floors. Play as a team or against each other; either way you're in for a scream with Mario and Luigi – the **MARIO BROS.**



I took on the Mutants knowing I was armed to the teeth with missiles, mines, torpedoes and more . . . I could even choose where I wanted to fight! How could I lose? . . . How DID I lose? I've never seen anything like it . . . they came at me in droves, in swirling gases, in forms spinning a deadly gossamer and there were more to come. I know now that one form of Mutant will never escape a well planned pattern of mines. It's just the beginning . . . but I must build the ultimate weapon or I'll NEVER be rid of them all! **"An essential purchase – miss it and you're missing something special" – Zzap**

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GUNSTAR



Are you sitting comfortably boy-things, girl-things and Vl'hurgs? Then I'll begin. A long, long time ago in a galaxy sufficiently far, far away to avoid legal complications there lived a little Japanese programmer called Lego-Brix. He had written a game called Space Invaders some months previously, and was feeling very pleased with himself. The game was making his company much honourable wampum.

Then in burst his boss. "Lego-brix", he said, "We have new machine for you to write program for. Look, it has a colour screen and an even bigger coin box. So go to it, my son". And with that, the boss disappeared in a cloud of cliches.

Lego thought for a minute. Why change a good thing? So he kept the invaders wandering about at the top of the screen, but made them spin and drop down occasionally to add a little spice. Then the fighter ship at the bottom had to dodge flying rocks, and eventually dock with a mother ship to refuel. A touch of colour, and the job was done. "Galaxians!" thought Lego-Brix, and got even smugger.

And that was the start of the art-form known as Space Shoot-'em-ups. Tradition decrees that no more than the barest minimum of detail shall be changed in each new incarnation of the work. Firebird has followed this edict with Gunstar, to produce a minimally innovative version of the old favourite. That's not to say there aren't frills. Dear me no.

There are three personas that fly the ships that shoot the lasers that battle the aliens that fly down the screen to invade good old Urth. Before each attack, the computer tells you who is flying this mission, where he comes from and what his hobby is (reading, baseball and pain are all popular, by the way). Then you get to zap the aliens, dodge the asteroids, mangle the robots and dock with the flying gas station.

The valiant fight to obliterate the intruders continues until one of three things happens. The ship can come into undue proximity with a bit of spacial debris. This can be an alien ship, a bit of asteroid or the good old fashioned blast from a gun.

Failing that, the engines can consume all the fuel before there's a chance to dock. Known as the M25 effect (after a famous highway on Old Earth where errant salesmen were doomed to drive around in circles and Cavaliers until they dropped), this can be a little disconcerting. Not to say fatal. The last and most avoidable death is brought about by firing lasers without a break until they melt and go whoooo-mph, as lasers do.

But, oh fortunate fellow, the engine temperature and fuel level is displayed in an easy-to-read colour coded format to the left of the main viewscreen. Thus the truly skilful can wreak maximum havoc and still make it home in time for a spot of brekky. And bear in mind, as you saunter through the galaxy, the soul of Lego-Brix, without whom we would still be playing Break-Out. What? Oh...

Author: Firebird
Price: £1.99

Nigel

Now I'm as capable of losing myself to a bit of alien bashing as the next man. I mean, if it wasn't so popular there wouldn't be all these games doing it, would there? And by the modest (bog) standards of shoot-'em-up as they-shoot-down, Gunstar almost makes the grade.

The only fly in the woodpile is the loooooong wait between one's ship being zapped and one being reincarnated – 20 seconds (count 'em) of meaningless sequence. Soon makes me reach for Lightforce...

15/20

Liz

I was in just the right mood for a bit of mindless zapping when I picked up the review copy of Gunstar. Oh good I thought, a budget game. No instructions to wade through, just grab the joystick and go. There may have been loads of games like this before, but the reason for that is that they are fun. I was a little upset about blowing up when my laser overheated but all the same I enjoyed the blast.

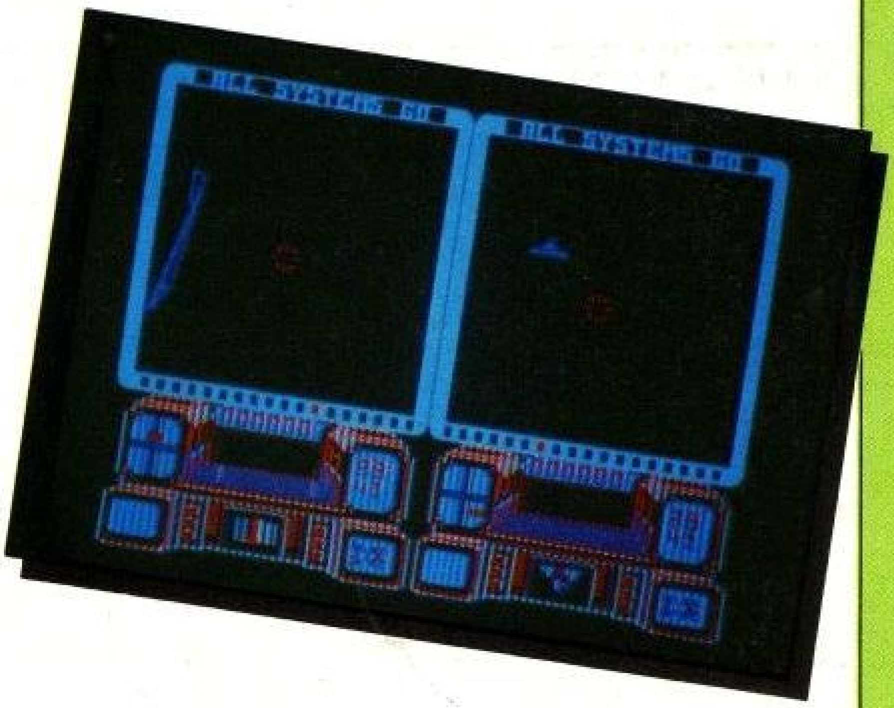
18/20

Colin

Grab joystick. Push left, little blob goes left. Likewise right. Press big red button, laserfire rips skywards. Down come the aliens. Bang. Pop. Boom. Yup, all there. It's even quite fun, and the little dashes of meaningless text in between lives adds atmosphere. Hope the Ed will forgive me, but there's nothing left to say. 'Cept it's just about worth two quid.

17/20

DOGFIGHT:2187



Now I know you might find it difficult to credit, but some people used to watch a BBC programme called Micro Live. An odd programme, it purported to be Aunty's response to the Information Technology revolution that was going on. The sharp of eye might have just noticed that it was in fact about all the clever things you could do with an overpriced underpowered 1981 design of microcomputer, which just happened to be called the BBC Micro. The more popular a machine was, the less likely it was to get featured on the programme. Like I said, odd.

The point of this meandering is that there was at one point a networked flight simulator shown, where two jolly fine chaps sat at two computers (guess what kind) linked by a length of wire and blew each other's vectorised wireframe graphics out of the rasterscan sky. Which is pretty much what goes on in Dogfight:2187, except that you only need the one computer. And it isn't even a BBC. Gosh.

What this wireless wonder features is a spacebound scenario, in which you, the square jawed hero Rhett Dextér, wander around the galaxy in search of enough bits of continuum generator to mend the rent in the space-time continuum through which (the physics gets a little shaky here) are pouring alien planets.

Of course, the aliens don't want this to happen. If it does, they'll be stuck in a universe where, according to the TV broadcasts they've been monitoring, people think the Beeb is a Good Thing. So they chase our hero Rhett around the place, he shoots them up, and everyone is happy.

But a second player can aid either the aliens or Rhett, and fly a second ship on-screen at the same time. On his half of the screen he sees Rhett and the aliens, and Rhett sees the opposite.

Each flyer has five readouts. One is the weapon selected. Bombs or lasers are available, and different types of alien ship are vulnerable in different ways. Each alien ship also has a weak spot, where a hit will be especially effective. This is shown on another readout, which displays a plan view of the aliens with the Achilles heel flashing.

There's a countdown clock showing how long everybody else has got before the aliens overrun the entire shop. A running total of the bits of generator picked up and a Galactic Compass complete the display checklist.

Built into the console are a radar display and fuel/ shield meters. There's also a scrolling message area above the screen, which warns if a refuel is called for. So just worry about the aliens, OK?

So far, it might almost seem like a run-of-the-mill cosmic cavort with the sort of graphics which were impressive two years ago but have lost their sheen since. But remember the true two-player option. Yup, two interacting space fight simulators on screen at once. As befits such an enterprise, everybody's keys can be completely redefined to minimise interdigital conflicts. It beats Space Invaders.

Author: Starlight
Price: £8.99 (tape) £14.99 (disc)

Nigel

I would be my usual blase self about this game normally. Vector scan graphics? Seen 'em. Galaxy-wide quest? Yawnarama. Perspective cockpit view? Starglider, man. Two players on screen at once? Wow.

This really is something special, providing you've got a friend to zap. A pretty 'mazing bit of coding. The only reservation is that as a one player game it's a bit simple. Don't let that stop you, and ignore the fact that the insert, instruction booklet and cassette have three totally different styles of Dogfight:2187. It's a new label, after all.

19/20

Liz

Two player games are great – Gauntlet is perhaps the greatest – but they cannot afford to rely on this aspect for their appeal. A good game should be just as playable solo. I prefer to play Salamander unaccompanied. As a two player game I'd rate this an 18 out of 20, but all told it doesn't merit that kind of score.

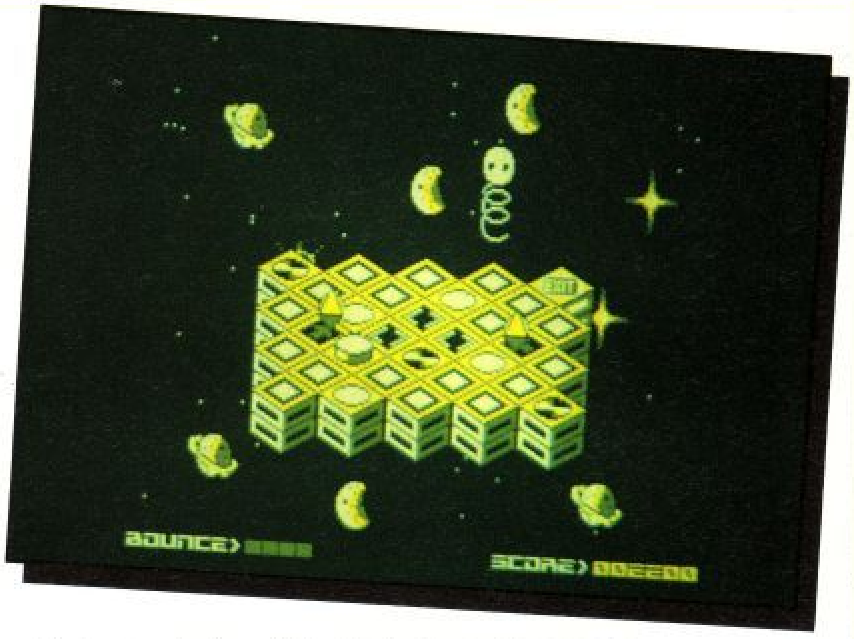
14/20

Colin

Top Gun in space: There may be a bit more depth to the plot and lots more to shoot at but it failed to grip me in the same way. Timothy Walter, who wrote the game, previously worked on Incentive's excellent Moon Cresta. Starlight's first game is a departure for him, a touch of the schizophrenic Starions.

12/20

PARABOLA



The evil dictator grinned at the figure sweating under the cruel white lights. Sweat ran down the bare torso of the man as he strained against the chair's bonds. He squinted at the figures and machinery in the murky background. The dictator spoke.

"Don't bother struggling, my friend. With our Psychic Probe, you'll soon suffer, squirm and squeal, Sisson Sebastion!"

"That's easy for you to say", said Sisson. The dictator looked pained. "Not with my lisp it isn't, you fool! Enough of this small talk. Doctor, the Probe!"

Sisson was aware of cold metal on his bare scalp, then a velvet wave drowned his thoughts...

He woke up in a strange place. He looked around. He was balanced on a platform suspended in space. The platform was composed of hundreds of square blocks, upon which wandered a number of geometrical shapes. On some of the blocks spun discs. He knew instinctively that those discs contained energy, energy he had to get to escape from this... this place.

With a shock, he realised that his shape had changed. No longer a man trapped in a dark dungeon, he was akin to a ball bearing on a spring. One part of his tortured mind insisted that this was the case, but another accepted the feelings as the only way to deal with the situation.

By experimentation, he found that he could bounce upon his spring, and thereby move from his original square. Shortly afterwards he made two more discoveries: Firstly, that round patterns on the blocks hid boobytraps that catapulted him into the air for many feet. And secondly that his new body was fragile, and any landing from more than a short distance resulted in a rapid discorporation. As he landed, his new world shimmered...

... and he was back at the start. Gingerly, he worked his way forwards, avoiding the wandering polygons and boobytraps. He collected an energy disc, and saw in the distance what could only be the exit square.

It took a long time, and many mistakes. His new body was clumsy, and there were many ways to die. Strangely enough, he couldn't fall off this tiny island in space, some strange force kept him on the blocks. Eventually he made it to the exit block. With a feral snarl of triumph, he leapt on to it. The world sparkled and dissipated again...

...and he was at the start of another island, different but just as deadly. He saw now how the Baron hoped to break his mind. By an endless series of delusionary landscapes, the dictator hoped to drive him into a state of hopelessness from which the only escape would be total submission. But there had to be an escape route, a way to beat the Psychic Probe that had produced these worlds.

All he could do was keep going until he overcame the machine's power to create new permutations. By struggling on, maybe a path back to reality could be his. He had to try.

Author: Firebird
Price: £1.99

Nigel

Every budget label has to have a Thing on a Spring clone. But I had hoped that Firebird could do better than this.

For starters, the joystick option on my copy didn't work. I had to use the define keys option after loading the game again. Mutter, mumble. The graphics are not splendid, and the layout demands precise control.

The response to the joystick is stodgy and slow, alas, so the control you need to get anywhere is abse is possible to steer about the place with practice, but it's a real battle. No fun, either.

10/20

Liz

You've seen Q*Bert? Yes? Then you've seen Parabola. You bounce around a pyramid, avoiding the nasties and collecting the discs. I couldn't get the joystick to work and hate diamond shaped movements. So despite the attractive mode 1 graphics I lost patience with this.

As a budget game it is OK I suppose but now some of the budget games are getting very, very good it is overshadowed.

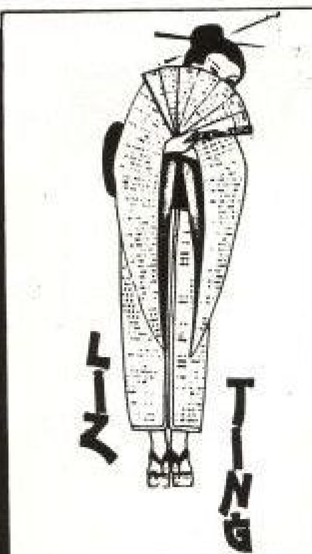
15/20

Colin

Like to come back to my place, bouncy-bouncy? Not if it's to play Parabola, sunshine. Thrash the joystick about a bit, try and dodge 500,000 permutations of three hazards, and fall asleep.

It's all here. When it comes down to value for money, a copy of the Turkish Eurovision entrant's single would win every time. Go away, nasty game.

9/20



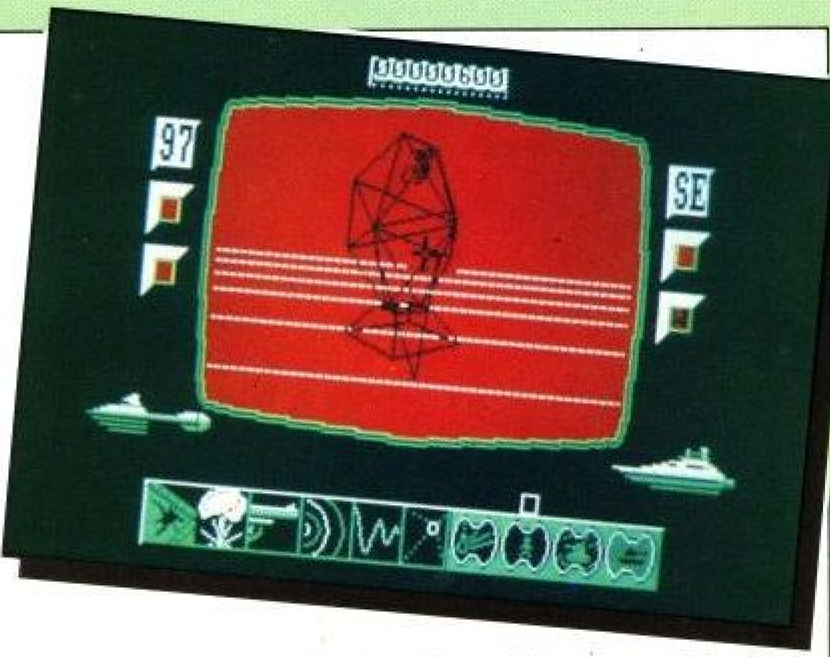
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How to join: See Page 20

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RED SCORPION

Let's skip over the long, inaccurate and mostly irrelevant background notes. This here game is about wandering a planet's surface, shooting at anything that shoots at you.

The view out of the window is a little depressing. The planet's surface is covered by a set of parallel lines, and not a lot else. In the distance, you occasionally see a tree with contrarotating that's even a little bit annoying. But wait.

It transpires that the inhabitants of the planet Bombyx (for so this place is named) are in fact in the process of being liberated by you and yours. Thus, any overtly nasty acts not directed at the planet's present oppressors (the Necrons) could be interpreted by the natives as not entirely the act of friends. And as these selfsame natives are the owners of vast mineral resources, any antagonistic actions will be frowned upon by the old top brass of the Terran Confederation Star Commandos, you'll be saluting civilians if you hit anything that doesn't hit you first.

The mere fact that you're cruising Bombyx in a weapon-encrusted Scorpion Mv IV, crammed to the bulwarks with acronymic annihilation gadgets, might seem a little unfriendly. But these Bombyxians are used to being liberated, so the Combat Action Visor (CAV), Head Up Display Weapon Aiming System (HUDWAS), Armour Piercing (AP) missiles and Cluster Bombs (CB), are really friendly, useful, can't kill anyone, low lethality devices.

The CAV is the clever one. It can see in microwave, infrared, visible light and ultraviolet regions of the electromagnetic spectrum, and by selecting the appropriate range almost any manifestation of the enemy mutants can be discerned prior to a prompt dissipation. (True Fact #31: the human cornea filters out UV rays. People with plastic corneas fitted after cataract operations can see stars at night that are completely invisible to the rest of us. Complete new constellations, in fact).

There's also a jamming system on board. This beast resonates and seals the fate of nuclear missiles, filled with fissiles, aimed at you to make ya' blue. It blows sky high the things that fly from the smoking guns of those Necron scum, but you have to tune it well or you'll get blown to... *(that's enough jammin' – Ed)*. Put simply, if a missile flies at you, you can blow it up – providing you can find its frequency.

You're not completely alone down there. Up above circle two support ships: The Coral Sea, to which you can repair if it all gets too much, and the Zuchov. The Zuchov can, upon request, do its party trick of raining down quite over-awesome amounts of naval gunnery from On High.

However, it can only do it in your immediate area, thus rendering a potentially useful idea somewhat flawed in practice. Still, your shields can take quite a lot of punishment really, so it might come in useful if you're stuck for anything more inventive.

All this, and you also have to maintain the incredibly high standards of your outfit (it says here), presumably the natty black combat jacket, the tight leather laser holster, the tastefully embroidered lace skull and crossbones. Of course, outfit could mean the Terran Confederation Star Commandos. But I doubt it.

Author: Argus Press
Price: £9.95

Nigel

Standard stuff for the old hands, firing lasers and missiles at 3D line drawings stuttering around a minimalist landscape out there. Shields that run down, lots and lots of gadgets and a fairly high degree of "ask questions first, shoot later" try to imbue this game with a little class.

Doesn't work, though; the line drawing could have been smoother, and all the wonderful devices get in the way of serious shooting fun. Don't like it.

13/20

Liz

You can't beat a good vector tank game for feel – this is a bit like Tank Busters at half speed. The comprehensive controls put back some of what the speed loss takes away, but not enough of it. I found the choice of the bottom row keys a bit odd, and kept on having to press them just to see what happened. A good enough game but it fails to sparkle.

15/20

Colin

The sleeve notes to this unremarkable game seem to have been written by someone who reads Harry Harrison and Jerry Pournelle in equal quantities, with the military precision of the former and the humour of the latter.

The game's not actually unplayable, it even gets enjoyable occasionally. But I could never get the hang of all those buttons, and always ended up court-martialled on my first shot. Some days you should never get out of bed...

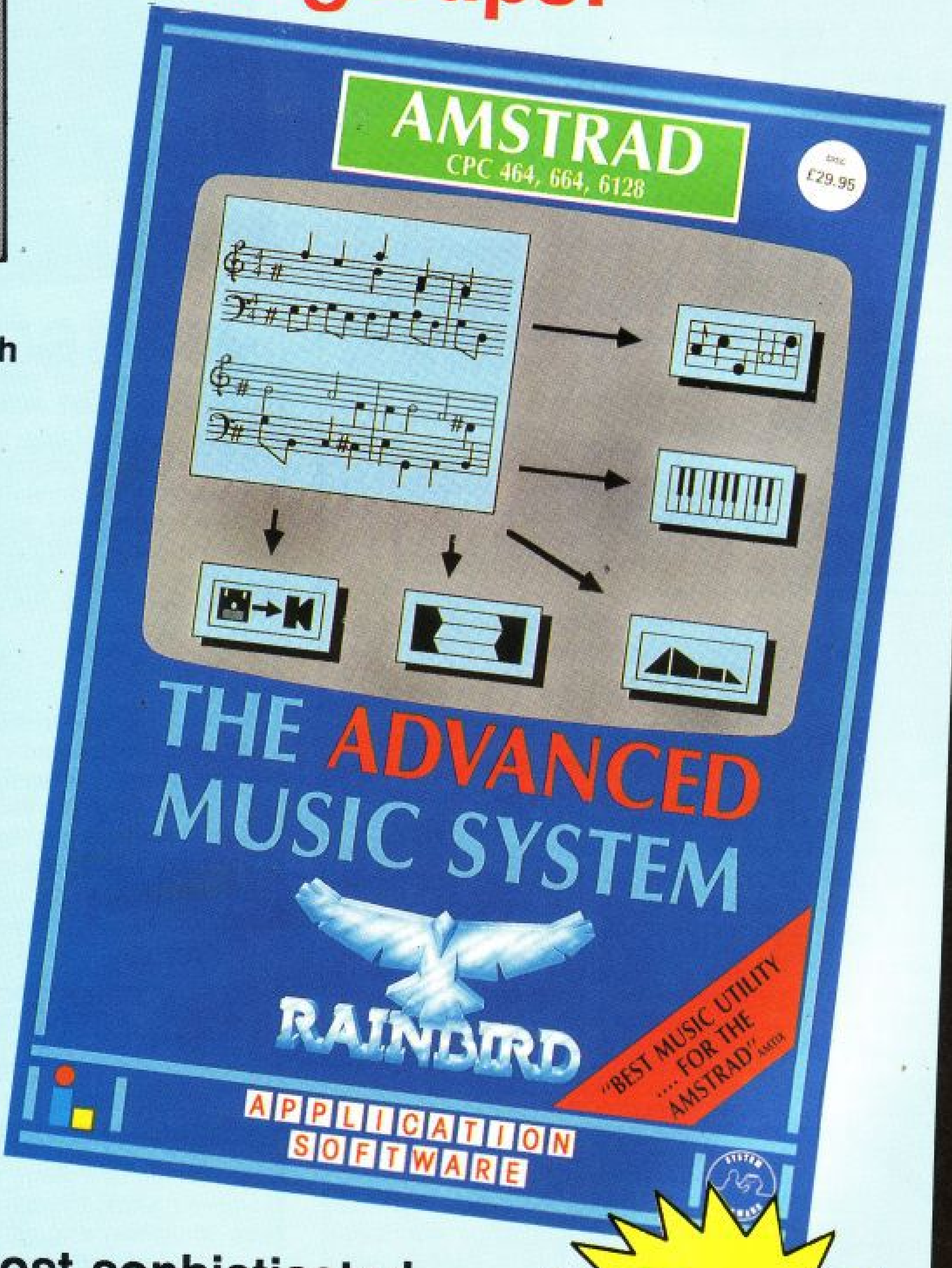
16/20

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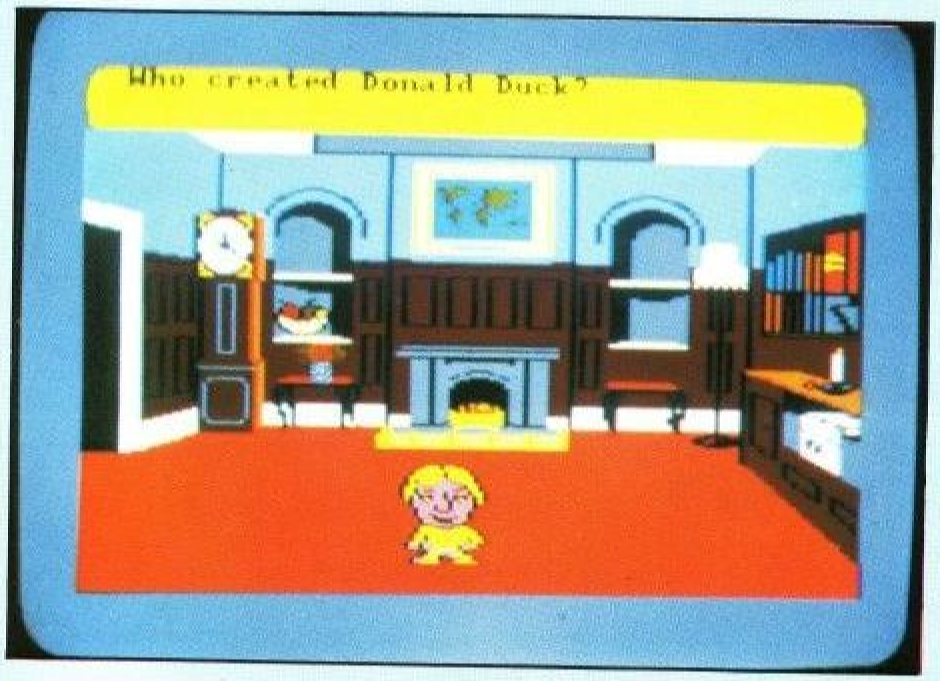
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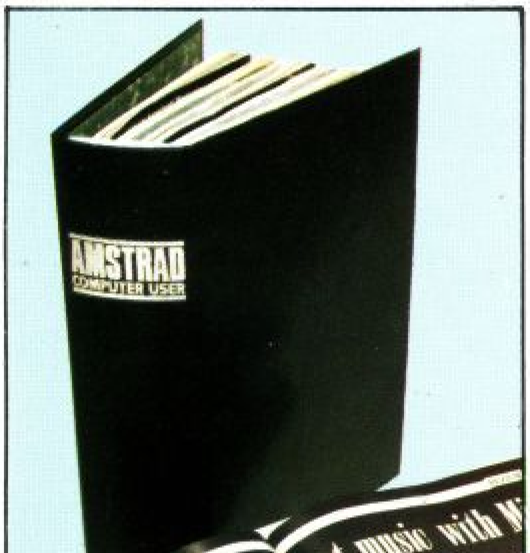
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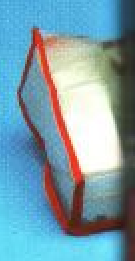
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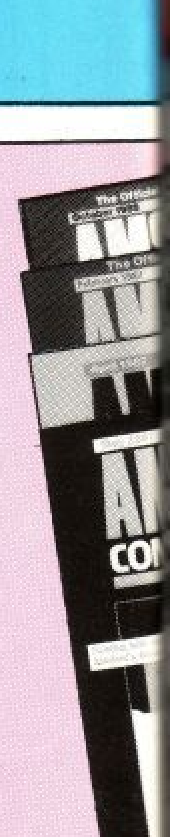
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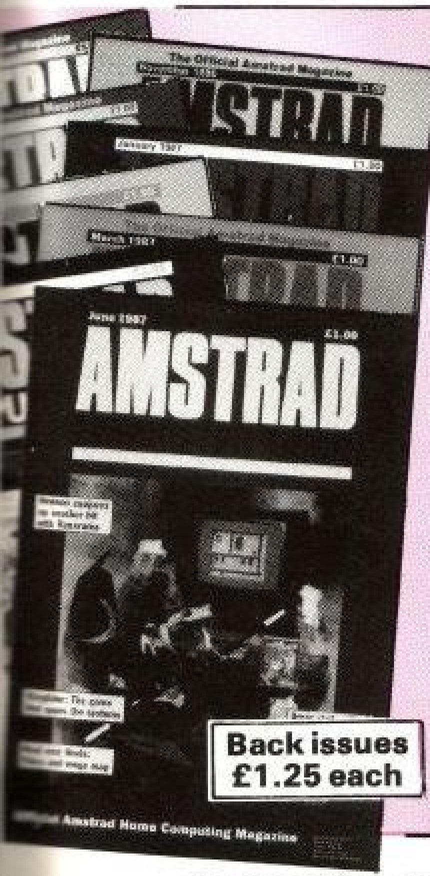
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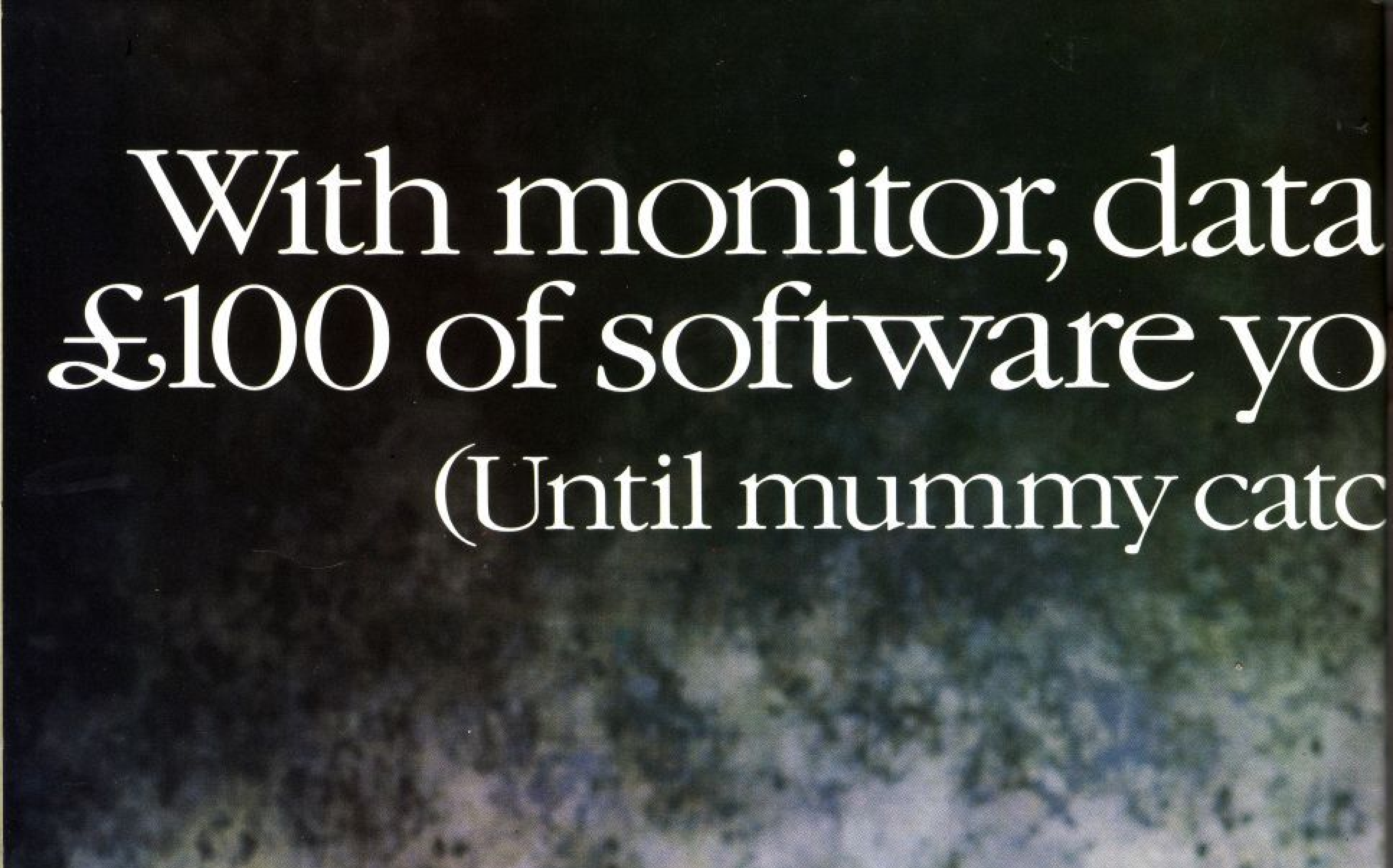
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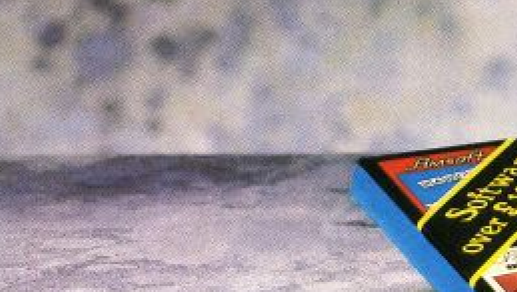
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The Least Significant Bit

The appointments at Amstrad Towers continue apace, a reflection of the company's growth. Malcolm Miller, the Sales and Marketing Director has "cloned" himself. Malcolm II is properly known as **Malcolm Tocher**, a man with a strong marketing background who understands market share, profile and penetration. He starts with a good foundation, as Romtec's figures have shown Amstrad to hold a 40 per cent share of the European PC market.

Keith moves in

Over on the sales side the new man is Keith Warburton, who has moved from Rodime, the Scottish-based hard disc manufacturer. Commuting from the other end of Britain can't be much fun. A computer expert, Mr. Warburton is a very popular appointment to the ninth floor at Amstrad.

Enter Susan

An earlier LSB detailed the appointment of Rosèmary as Alan Sugar's new secretary and guessed that she would have her name used as the code name for any new Amstrad computer. Well it appears that this is no longer the case. Rosemary has left, probably to the relief of those journalists who failed to conquer her telephone manner attempting to speak to Alan Sugar. Unfortunately the millionaire has a replacement, **Susan**, who has yet to face the fourth estate's full firepower.

Sugar junior

One of the most important appointments is to quite a lowly position. Thomas Power, Malcom and Malcom's sidekick has a new assistant: **Daniel Sugar**. He will be treated just like any other junior member of staff, the memo said.

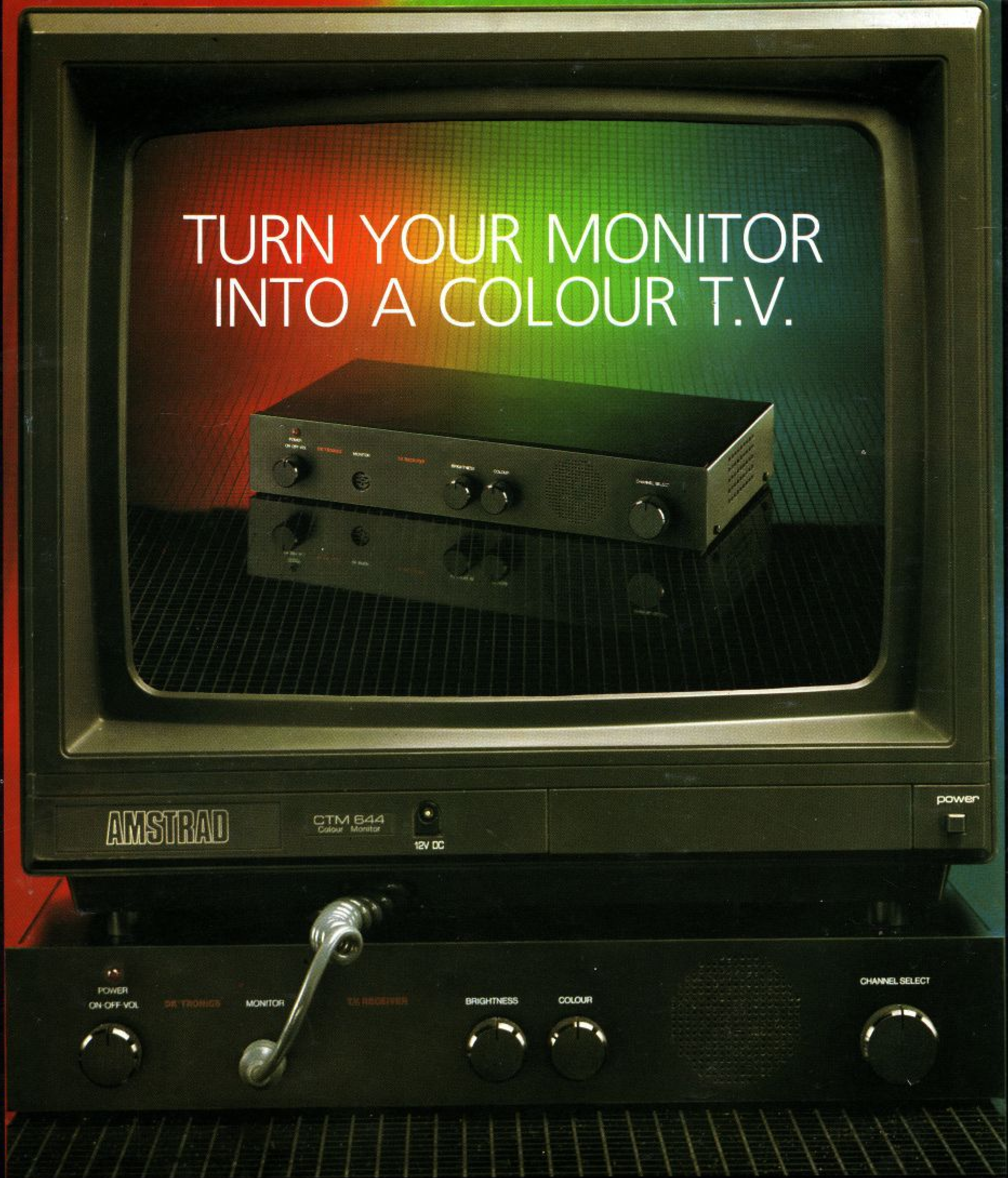
No fooling

Things on Micronet have become a bit confused, thanks to our April Fool. Amstrad has pulled out of the satellite project, but will still make receivers when the "bird" goes skyward, even iif it no longer intends to finance the project. When a reader commented on this our friends at the 'net confused the event with our spoof and denied it was true. *(He was later found out to be lying – Ed.)*

Alan's target

Alan Sugar has announced Amstrad's new slogan. He told a conference in the City: "Securicor Cares, Pan Am take more care of you, Amstrad – We want your money". Thanks Alan.

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